GE

Voluson i / Voluson e

Service Manual

- Voluson i / Voluson e systems with Software version SW 6.x.x (BT06)
- Voluson i / Voluson e systems with Software version SW 7.x.x (BT07)
- Voluson i / Voluson e systems with Software version SW 8.x.x (BT09/11)
- Voluson i / Voluson e systems with Software version SW CC200 (BT14)

Part Number: KTI106052
Revision: 10

CE 0123

Important Precautions

TRANSLATION POLICY

WARNING
(EN)

THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.

- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**
- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

AVERTISSEMENT
(FR)

CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.

- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**
- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

WARNUNG
(DE)

DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.

- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**
- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO
(ES)

ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.

- SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEHC SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.
- NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.
- LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.

ATENÇÃO
(PT-Br)

ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.

- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.
- O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A‘ CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.

AVISO
(PT-pt)

ESTE MANUAL DE ASSISTÊNCIA ESTÁ DISPONÍVEL APENAS EM INGLÊS.

- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENTE EFECTUAR REPARAÇÕES NO EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO PREVIAMENTE ESTE MANUAL.
- A INOBSERVÂNCIA DESTE AVISO PODE RESULTAR EM FERIMENTOS NO TÉCNICO DE ASSISTÊNCIA, OPERADOR OU PACIENTE EM CONSEQUÊNCIA DE CHOQUE ELÉCTRICO, PERIGOS DE ORIGEM MECÂNICA, BEM COMO DE OUTROS TIPOS.

AVVERTENZA
(IT)

IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.

- SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEHC RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.
- SI PROCEDA ALLA MANUTENZIONE DELL’APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.
- NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL’ADDETTO ALLA MANUTENZIONE, ALL’UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.

HOIATUS
(ET)

KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.

- **KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.**
- **ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.**
- **KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.**

VAROITUS
(FI)

TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.

- **JOS ASIAKKAAN PALVELUNTARJOAJA VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.**
- **ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.**
- **MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA PALVELUNTARJOAJAN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.**

ΠΡΟΕΙΔΟΠΟΙΗΣΗ
(EL)

ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.

- **ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.**
- **ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.**
- **ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ ΊΗ ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ ΊΗ ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.**

FIGYELMEZTETÉS
(HU)

EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.

- **HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.**
- **NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.**
- **EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.**

VIÐVÖRUN
(IS)

ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.

- **EF ÞJÓNUSTUAÐILI VIÐSKIPTAMANNS ÞARFNAST ANNARS TUNGUMÁLS EN ENSKU, ER ÞAÐ Á ÁBYRGÐ VIÐSKIPTAMANNS AÐ ÚTVEGA ÞÝÐINGU.**
- **REYNIÐ EKKI AÐ ÞJÓNUSTA TÆKIÐ NEMA EFTIR AÐ HAFA SKOÐAÐ OG SKILIÐ ÞESSA ÞJÓNUSTUHANDBÓK.**
- **EF EKKI ER FARIÐ AÐ ÞESSARI VIÐVÖRUN GETUR ÞAÐ VALDIÐ MEIÐSLUM ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS VEGNA RAFLOSTS, VÉLRÆNNAR EÐA ANNARRAR HÆTTU.**

VÝSTRAHA
(CS)

TENTO SERVISNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.

- **V PŘÍPADĚ, ŽE POSKYTOVATEL SLUŽEB ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.**
- **NEPROVÁDĚJTE ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO SERVISNÍ NÁVOD A POCHOPILI JEHO OBSAH.**
- **V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.**

ADVARSEL
(DA)

DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.

- **HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.**
- **FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL ER BLEVET LÆST OG FORSTÅET.**
- **MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.**

WAARSCHUWING
(NL)

DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.

- **ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.**
- **PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.**
- **INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.**

BRĪDINĀJUMS (LV)

ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.

- **JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.**
- **NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.**
- **ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.**

ĮSPĖJIMAS (LT)

ŠIS EKSPLOATAVIMO VADOVAS YRA IŠLEISTAS TIK ANGLŲ KALBA.

- **JEI KLIENTO PASLAUGŲ TEIKĖJUI REIKIA VADOVO KITA KALBA – NE ANGLŲ, VERTIMU PASIRŪPINTI TURI KLIENTAS.**
- **NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS DARBŲ, NEBENT VADOVAUTUMĖTĖS ŠIUO EKSPLOATAVIMO VADOVU IR JĮ SUPRASTUMĖTE**
- **NEPAISANT ŠIO PERSPĖJIMO, PASLAUGŲ TEIKĖJAS, OPERATORIUS AR PACIENTAS GALI BŪTI SUŽEISTAS DĖL ELEKTROS SMŪGIO, MECHANINIŲ AR KITŲ PAVOJŲ.**

ADVARSEL (NO)

DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.

- **HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.**
- **IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.**
- **MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.**

OSTRZEŻENIE (PL)

NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.

- **JEŚLI FIRMA ŚWIADCZĄCA KLIENTOWI USłUGI SERWISOWE WYMAGA UDOSTĘPNIENIA PODRĘCZNIKA W JĘZYKU INNYM NIŻ ANGIELSKI, OBOWIĄZEK ZAPEWNIENIA STOSOWNEGO TłUMACZENIA SPOCZYWA NA KLIENCIE.**
- **NIE PRÓBOWAĆ SERWISOWAĆ NINIEJSZEGO SPRZĘTU BEZ UPRZEDNIEGO ZAPOZNANIA SIĘ Z PODRĘCZNIKIEM SERWISOWYM.**
- **NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOżE GROZIĆ OBRAŻENIAMI CIAłA SERWISANTA, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA PRĄDEM, URAZU MECHANICZNEGO LUB INNEGO RODZAJU ZAGROŻEŃ.**

ATENȚIE
(RO)

ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.

- **DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENȚULUI SĂ FURNIZEZE O TRADUCERE.**
- **NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.**
- **IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.**

ОСТОРОЖНО!
(RU)

ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.

- **ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.**
- **ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.**
- **НЕСОБЛЮДЕНИЕ УКАЗАННЫХ ТРЕБОВАНИЙ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ТЕХОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЗЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.**

ПРЕДУПРЕЖДЕНИЕ
(BG)

ТОВА СЕРВИЗНО РЪКОВОДСТВО Е НАЛИЧНО САМО НА АНГЛИЙСКИ ЕЗИК.

- **АКО ДОСТАВЧИКЪТ НА СЕРВИЗНИ УСЛУГИ НА КЛИЕНТ СЕ НУЖДАЕ ОТ ЕЗИК, РАЗЛИЧЕН ОТ АНГЛИЙСКИ, ЗАДЪЛЖЕНИЕ НА КЛИЕНТА Е ДА ПРЕДОСТАВИ ПРЕВОДАЧЕСКА УСЛУГА.**
- **НЕ СЕ ОПИТВАЙТЕ ДА ИЗВЪРШВАТЕ СЕРВИЗНО ОБСЛУЖВАНЕ НА ТОВА ОБОРУДВАНЕ, ОСВЕН ВСЛУЧАЙ, ЧЕ СЕРВИЗНОТО РЪКОВОДСТВО Е ПРОЧЕТЕНО И СЕ РАЗБИРА.**
- **НЕСПАЗВАНЕТО НА ТОВА ПРЕДУПРЕЖДЕНИЕ МОЖЕ ДА ДОВЕДЕ ДО НАРАНЯВАНЕ НА ДОСТАВЧИКА НА СЕРВИЗНИ УСЛУГИ, НА ОПЕРАТОРА ИЛИ ПАЦИЕНТА ВСЛЕДСТВИЕНА ТОКОВ УДАР, МЕХАНИЧНИ ИЛИ ДРУГИ РИСКОВЕ.**

UPOZORENJE
(SR)

OVAJ PRIRUČNIK ZA SERVISIRANJE DOSTUPAN JE SAMO NA ENGLESKOM JEZIKU.

- **AKO KLIJENTOV SERVISER ZAHTEVA JEZIK KOJI NIJE ENGLESKI, ODGOVORNOST JE NA KLIJENTU DA PRUŽI USLUGE PREVOĐENJA.**
- **NEMOJTE POKUŠAVATI DA SERVISIRATE OPREMU AKO NISTE PROČITALI I RAZUMELI PRIRUČNIK ZA SERVISIRANJE.**
- **AKO NE POŠTUJETE OVO UPOZORENJE, MOŽE DOĆI DO POVREĐIVANJA SERVISERA, OPERATERA ILI PACIJENTA UZROKOVANOG ELEKTRIČNIM UDAROM, MEHANIČKIM I DRUGIM OPASNOSTIMA.**

OPOZORILO
(SL)

TA SERVISNI PRIROČNIK JE NA VOLJO SAMO V ANGLEŠČINI.

- **ČE PONUDNIK SERVISNIH STORITEV ZA STRANKO POTREBUJE NAVODILA V DRUGEM JEZIKU, JE ZA PREVOD ODGOVORNA STRANKA SAMA.**
- **NE POSKUŠAJTE SERVISIRATI OPREME, NE DA BI PREJ PREBRALI IN RAZUMELI SERVISNI PRIROČNIK.**
- **ČE TEGA OPOZORILA NE UPOŠTEVATE, OBSTAJA NEVARNOST ELEKTRIČNEGA UDARA, MEHANSKIH ALI DRUGIH NEVARNOSTI IN POSLEDIČNIH POŠKODB PONUDNIKA SERVISNIH STORITEV, UPORABNIKA OPREME ALI PACIENTA.**

UPOZORENJE
(HR)

OVAJ SERVISNI PRIRUČNIK DOSTUPAN JE SAMO NA ENGLESKOM JEZIKU.

- **AKO KLIJENTOV SERVISER ZAHTIJEVA JEZIK KOJI NIJE ENGLESKI, ODGOVORNOST KLIJENTA JE PRUŽITI USLUGE PREVOĐENJA.**
- **NEMOJTE POKUŠAVATI SERVISIRATI OPREMU AKO NISTE PROČITALI I RAZUMJELI SERVISNI PRIRUČNIK.**
- **AKO NE POŠTUJETE OVO UPOZORENJE, MOŽE DOĆI DO OZLJEDE SERVISERA, OPERATERA ILI PACIJENTA PROUZROČENE STRUJNIM UDAROM, MEHANIČKIM I DRUGIM OPASNOSTIMA.**

UPOZORNENIE
(SK)

TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.

- **AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.**
- **NEPOKÚŠAJTE SA VYKONÁVAŤ SERVIS ZARIADENIA SKÔR, AKO SI NEPREČÍTATE SERVISNÚ PRÍRUČKU A NEPOROZUMIETE JEJ.**
- **ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, PRÍPADNE DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.**

VARNING
(SV)

DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.

- **OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.**
- **FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.**
- **OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.**

DİKKAT
(TR)

BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.

- **EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.**
- **SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.**
- **BU UYARININ GÖZ ARDI EDİLMESİ, ELEKTRİK ÇARPMASI YA DA MEKANİK VEYA DİĞER TÜRDEN KAZALAR SONUCUNDA TEKNİSYENİN, OPERATÖRÜN YA DA HASTANIN YARALANMASINA YOL AÇABİLİR.**

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(JA)

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(ZH-CN)

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(KO)

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SERVICE SAFETY CONSIDERATIONS

⚠ DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

⚠ WARNING ***Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.***

For a complete review of all safety requirements, see the Chapter 1, Safety Considerations section in the Service Manual.

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Revision History

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1	April 14, 2006	Initial Release
2	August 18, 2006	Implementation of new parts and peripherals, general update and modification
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4	April 04, 2007	Implementation of new parts, release of BT´07 software version 7.0.x
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Title Page	10	Chapter 3 - Setup Instructions pages 3-1 to 3-122	10	Chapter 8 - Replacement Procedures pages 8-1 to 8-88	10
Important Precautions pages i to xi	10	Chapter 4 - Functional Checks pages 4-1 to 4-40	10	Chapter 9 - Renewal Parts pages 9-1 to 9-54	10
Rev History/LOEP page xii	10	Chapter 5 - Components and Functions (Theory) pages 5-1 to 5-60	10	Chapter 10 - Care & Maintenance pages 10-1 to 10-26	10
Table of Contents pages xiii to xlii	10	Chapter 6 - Service Adjustments pages 6-1 to 6-12	10	Index pages I to IV	10
Chapter 1 - Introduction pages 1-1 to 1-18	10	Chapter 7 - Diagnostics/ Troubleshooting pages 7-1 to 7-38	10	Back Cover	10
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Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the Voluson i / Voluson e.
The service provider must read and understand all the information presented in this manual before installing or servicing a unit.
Always observe the instructions given in the manual of the peripheral/auxiliary device.

Under consideration of general maintenance requirements a minimum lifetime of 7 years for the equipment and 5 years for the probes may be expected. To maintain the safety and performance of the ultrasound system, a regular check (once per year) by authorized personnel is recommended.

Table 1-1 Contents in Chapter 1

Section	Description	Page Number
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1-1-2 Purpose of this Service Manual

NOTICE *This Service Manual is valid for **Voluson i / Voluson e** ultrasound systems.
For the sake of simplicity, **descriptions in this manual will be briefly denoted with Voluson i / Voluson e if no special differentiation is required.***

This Service Manual provides installation and service information for the Voluson i / Voluson e portable Ultrasound Scanning System and contains the following chapters:

1.) **Chapter 1 - Introduction:** Contains a content summary and warnings.
2.) **Chapter 2 - Site-Preparation:** Contains pre-installation requirements.
3.) **Chapter 3 - Setup Instructions:** Contains setup and installation procedures.
4.) **Chapter 4 - Functional Checks:** Contains functional checks that are recommended as part of the installation, or as required during servicing and periodic maintenance.
5.) **Chapter 5 - Components and Functions (Theory):** Contains block diagrams and functional explanations of the electronics.
6.) **Chapter 6 - Service Adjustments:** Contains instructions on how to make available adjustments.
7.) **Chapter 7 - Diagnostics/Troubleshooting:** Provides procedures for running diagnostic or related routines.
8.) **Chapter 8 - Replacement Procedures:** Provides disassembly procedures and reassembly procedures for all changeable Field Replaceable Units (FRU).
9.) **Chapter 9 - Renewal Parts:** Contains a complete list of field replaceable parts.
10.) **Chapter 10 - Care & Maintenance:** Provides periodic maintenance procedures.

1-1-3 Typical Users of the Basic Service Manual

- GE Service Personnel (installation, maintenance, etc.).
- Hospital's Service Personnel
- Contractors (Some parts of Chapter 2 - Site Preparation)

1-1-4 Models Covered by this Manual

Table 1-2 Voluson i / Voluson e Model Designations

Part Number	Description
H48651KR	Voluson i Console (BT06)
H48661D	Voluson e Console (BT06)
H48661AD	Voluson i Console (BT07)
H48651WN	Voluson e Console (BT07)
H48671PW	Voluson i Console (BT09/11)
H48671PS	Voluson e Console (BT09/11)
H48691LS	Voluson i Console CC200 (BT14)
H48691LT	Voluson e Console CC200 (BT14)

The Voluson i / Voluson e is a compact, fully portable, phased, linear array ultrasound imaging scanner. Weighing only 5 kg / 11 lbs. (without peripherals), this laptop-style system offers many advanced features and is extremely versatile. Depending upon the installed software, the Voluson i / Voluson e portable ultrasound system can be used for a variety of ultrasound scanning applications.

The Voluson i / Voluson e portable ultrasound systems are based on parallel products in the Voluson family (Voluson 730, Voluson 730Expert, Voluson 730Pro/ProV and Voluson E8).
Using the same advanced technology, the innovative features and versatility of the system represent the future of ultrasound scanning.

NOTICE **The Voluson e is a "feature-reduced" version of the Voluson i portable ultrasound system.** That means not all options are available on the Voluson e (marked with * in sections of this Manual).

The Voluson e is **only distinguished by the System type**, see: *Figure 7-1: System Setup - System Info page (e.g., Voluson e) on page 7-2*; it has **NO** own serial number!

NOTE: *Upgrade options may be available with future versions.*

1-1-5 System History - Hardware and Software Versions

This manual applies to:

- Voluson i / Voluson e systems with Serial Number B00020 - B00742 (BT06)
- Voluson i systems with Serial Number B01001 - B01494 (BT07)
- Voluson e systems with Serial Number B50001 - B50799 (BT07)
- Voluson i systems with Serial Number B02000 - B02779 (BT09)
- Voluson e systems with Serial Number B52000 - B53200 (BT09)
- Voluson i systems with Serial Number B03001 - (BT11)
- Voluson e systems with Serial Number B53261 - (BT11)
- Voluson i systems with Serial Number B05001 - (CC200 / BT14)
- Voluson e systems with Serial Number B57001 - (CC200 / BT14)

1-1-6 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the Voluson i / Voluson e and also kept near the unit for quick reference.

Section 1-2
Important Conventions

1-2-1 Conventions Used in this Manual

Model Designations

This manual covers the Voluson i / Voluson e ultrasound units listed in Table 1-2 on page 1-2.

Icons

Pictures, or icons, are used wherever they will reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

Safety Precaution Messages

Various levels of safety precaution messages may be found on the equipment and in the service information. The different levels of concern are identified by a flag word that precedes the precautionary message. Known or potential hazards are labeled in one of following ways:

⚠ **DANGER** **INDICATES THE PRESENCE OF A HAZARD THAT WILL CAUSE SEVERE PERSONAL INJURY OR DEATH IF THE INSTRUCTIONS ARE IGNORED.**

⚠ **WARNING** ***INDICATES THE PRESENCE OF A HAZARD THAT CAN CAUSE SEVERE PERSONAL INJURY AND PROPERTY DAMAGE IF INSTRUCTIONS ARE IGNORED.***

⚠ **CAUTION** **Indicates the presence of a hazard that will or can cause minor personal injury and property damage if instructions are ignored.**

⚠ **NOTICE** **Equipment Damage Possible.**
Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk.
Example: Disk drive will crash.

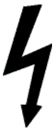
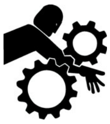
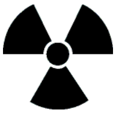
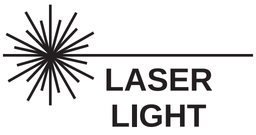
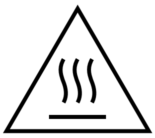
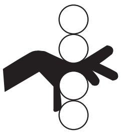
⇨ **BT Version:** Is used when options or features are specific for BT-Software versions.

NOTE: Notes provide important information about an item or a procedure.
Information contained in a NOTE can often save you time or effort.

1-2-2 Standard Hazard Icons

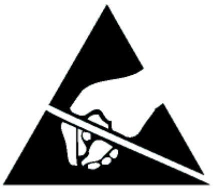
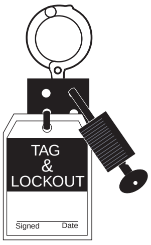
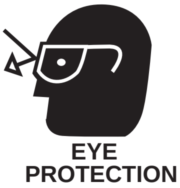
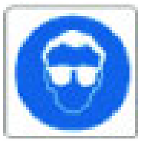
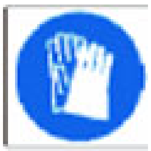
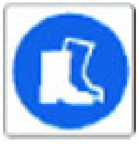
Important information will always be preceded by the exclamation point contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm. Even if a symbol isn't used in this manual, it is included for your reference.

Table 1-3 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION
		
LASER	**HEAT**	**PINCH**
		

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-4 Standard Icons Indicating a Special Procedure be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION
		 or 
WEAR HAND PROTECTION	**WEAR FOOT PROTECTION**	
		

1-2-3 Product Labels and Icons

The following table describes the purpose and location of safety labels and other important information provided on the equipment.
Description of symbols and labels used in combination with this Voluson ultrasound system.

BT Version: Product labels and its location depend on BT-version and/or date of manufacture. For description of all symbols and labels used on the system, refer to Chapter 2 in the Basic User Manual of your system.

Table 1-5 Product Icons

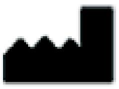
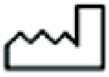
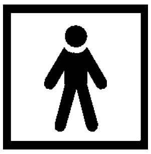
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
Identification and Rating Plate	Manufacturer's name and address Model and serial numbers Electrical ratings	on the base of the unit (Main label) on each probe
	Manufacturer's name and address	Identification and Rating Plate(rear side of the unit / on plug of each probe)
	Date of manufacture	Identification and Rating Plate(rear side of the unit / on plug of each probe)
SN	Serial number	Identification and Rating Plate(rear side of the unit / on plug of each probe)
REF	Catalog or model number	Identification and Rating Plate(rear side of the unit / on plug of each probe)
Device Listing/Certification Labels	Laboratory logo or labels denoting conformance with industry safety standards such as UL or IEC.	on the base of the unit (Main label)
CE 0123	CE Conformity mark according to Medical Device Directive 93/42/EEC. **0123**: Identification number of notified body TÜV Süd Product Service.	on the base of the unit (Main label) on each probe
C TÜV SÜD NRTL US	"Tested and production monitored by TÜV Product Service NRTL with respect to ELECTRICAL SHOCK, FIRE and MECHANICAL HAZARDS only in accordance with UL2601-1 and CAN/CSA C22.2 NO.601.1."	Identification and Rating Plate (rear side of the unit)
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX 0) IP Code (IPX 1) IP Code (IPX 7)	degree of protection provided by the enclosure per IEC 60529: IPX 0 - no protection against ingress of water IPX 1 - protected against dripping water IPX 7 - protected against the effects of immersion	various
	Equipment Type BF (man in the box symbol) IEC 878-02-03 indicates B Type equipment having even more electrical isolation than standard Type B equipment because it is intended for intimate patient contact.	probe connectors on the base of the unit (Main label)

Table 1-5 Product Icons (Continued)

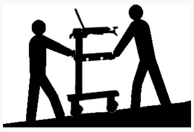
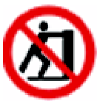
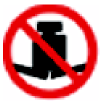
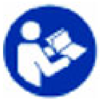
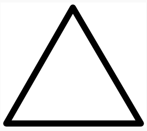
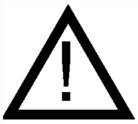
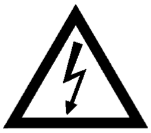
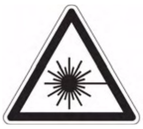
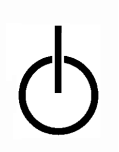
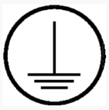
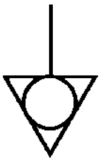
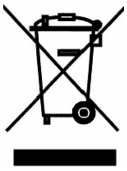
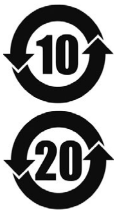
LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
“CAUTION This unit weighs... Special care must be used to avoid..." 	This precaution is intended to prevent injury that may result if one person attempt to move heavy parts (e.g., the optional Modo Cart, Dock Cart or Voluson Station) considerable distances or on an incline due to its weight. Two people are required whenever a part weighing 16kg (35 lbs.) or more must be lifted.	Used in the Service and User Manual which should be adjacent to equipment at all times for quick reference.
	Pushing prohibited. Do not lean on the system. Tipping danger. Take special care when moving the system	various
	Loading prohibited. Do not put any items on this shelf. Danger of breaking. Also items might be crushed when lowering the user interface.	at top cover of the system
	“ATTENTION” - Read and understand all instructions for use” This symbol advises the reader to consult the accompanying documents (operator manual or other instructions).	rear side of the unit
"DANGER - Risk of explosion used in..."	The system is not designed for use with flammable anesthetic gases.	Indicated in the Service Manual.
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	various
	ATTENTION - Consult accompanying documents " This symbol is used to advise the reader to consult the accompanying documents for important safety-related information such as warnings and pre-cautions that cannot be presented on the device itself.	various
	"CAUTION - Dangerous electric voltage" (lightning flash with arrowhead) is used to indicate electric shock hazards. Unplug the main plug before opening the system.	various
	CAUTION - Laser radiation Avoid exposure to the beam Class 3B laser product. CAUTION - Class 3B laser radiation. When open avoid exposure to the beam.	various
	"OFF/Standby" Indicates the power off/standby position of the power switch. **CAUTION** **This Power Switch DOES NOT ISOLATE Main Supply**	adjacent to On-Off/Standby switch

Table 1-5 Product Icons (Continued)

LABEL/SYMBOL	PURPOSE/MEANING	LOCATION
	"Protective Earth" Indicates the protective earth (grounding) terminal.	various
	"Equipotentiality" Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.	peripherals isolation transformer on Modo Cart
	Waste Electrical and Electronic Equipment (WEEE) Disposal. This symbol indicates that waste electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	on the base of the unit (Main label) on back of the Modo Cart (Main label) on back of the Dock Cart (Main label) on back of the Voluson Station (Main label) on each probe
Rx only	This symbol indicates that in the United States of America, federal law restricts this device to sale by or on the order of a physician.	Identification and Rating Plate (rear side of the unit)
	GOST-R label (Russia Regulatory Country Clearance)	Identification and Rating Plate (rear side of the unit)
	These symbols indicate that at least one of the six hazardous substances of the China RoHS Labelling Standard is above the RoHS limitation.The number inside the circle is referred to as the Environmental Friendly Use Period (EFUP). It indicates the number of years that the product, under normal use, will remain harmless to health of humans or the environment. EFUP = 10 for Short Use Products EFUP = 20 for Medium Use Products	Rear side of the unit on the plug of each probe
Hg LAMP CONTAINS MERCURY, DISPOSE ACCORDING TO STATE/LOCAL LAW.	This product consists of devices that may contain mercury, which must be recycled or disposed of in accordance with local, state, or country laws. (Within this system, the backlight lamps in the monitor and the Touch Panel display, contain mercury.)	Rear side of the unit on the Display Module Assy (GPD)

Section 1-3
Safety Considerations

1-3-1 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

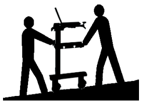
1-3-2 Human Safety

Operating personnel must not remove the system covers. Servicing should be performed by authorized personnel only. Only personnel who have participated in a Voluson i / Voluson e Training are authorized to service the equipment.

1-3-3 Mechanical Safety

CAUTION **The Voluson i / Voluson e portable ultrasound system weighs 5 kg / 11 lbs. (without peripherals) when ready for use.**
Care must be used when moving it or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.

CAUTION **The Cart (incl. Voluson i / Voluson e and peripherals) weighs approximately 30 kg / 66 lbs. when it is ready for use.**
Two people are required when moving on inclines or lifting more than 16 kg (35 lbs).
Move the Cart forward or backward when going up or down inclines. Do not move the Cart sideways or diagonally.



ALWAYS:

- **Be sure the pathway is clear.**
- **Use slow, careful motions.**

WARNING ***It is not possible to fix the Voluson i / Voluson e on mounting plate of the Cart. When the Voluson i / Voluson e scanner is used with the Cart, make sure the unit is firmly placed in correct position since it may become unstable and tip over.***

WARNING ***Use extreme caution when elevating the Cart , or if it is moved along any incline. Make sure that the Voluson i / Voluson e scanner and all peripherals are securely placed on the Cart before attempting to move it.***

WARNING ***ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.***

WARNING ***NEVER USE A PROBE THAT HAS FALLEN TO THE FLOOR.***
EVEN IF IT LOOKS OK, IT MAY BE DAMAGED.

WARNING ***WHILE THE SOFTWARE INSTALL PROCEDURE IS DESIGNED TO PRESERVE DATA, YOU SHOULD SAVE ANY PATIENT DATA, IMAGES, SYSTEM SETUPS TO A DVD/CD OR HARDCOPY.***

WARNING ***Always lock the Cart in its parked (locked) position after moving the system. Failure to do so could result in personal injury or equipment damage.***

WARNING ***Equipment damage could result if special care is not taken when transporting the Voluson i / Voluson e system (and Carts if applicable) in a vehicle.***

1-3-3 Mechanical Safety (cont'd)

Always:

- *Eject any DVD/CD from the drive.*
- Ensure that the Voluson i / Voluson e system is well prepared and packed in its original packaging before transporting. Special care must be taken to correctly position the packing material. For further information, refer to Chapter 3 - Setup Instructions on page 3-1.
- Place the probes in their carrying cases.
- Secure the Cart in an upright position and lock the wheels (brake).
- Ensure that the Voluson i / Voluson e system (and Cart if applicable) is firmly secured while inside the vehicle.
- Secure the system with straps or as directed otherwise to prevent motion during transport.
- Prevent vibration damage by driving cautiously. Avoid unpaved roads, excessive speeds, and erratic stops or starts.

1-3-4 Electrical Safety

1-3-4-1 Safe Practices

The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety ground. If an extension cord is used with the system, make sure that the total current rating of the system does not exceed the extension cord rating.

The power outlet of the AC/DC converter used for this equipment should not be shared with other types of equipment. Both, the system power cable and the power connector meet international electrical standards.

⚠ **WARNING** ***CONNECTING A VOLUSON I / VOLUSON E SCANNER TO THE WRONG VOLTAGE LEVEL WILL MOST LIKELY DESTROY THE SCANNER.***

1-3-4-2 Probes

All the probes for the Voluson i / Voluson e portable ultrasound system are designed and manufactured to provide trouble-free, reliable service. To ensure this, correct handling of probes is important and the following points should be noted:

- Do not drop a probe or strike it against a hard surface, as this may damage the transducer elements, acoustic lens, or housing.
- Inspect the probe prior to each use for damage or degradation to the Housing, Cable strain relief, Lens and Seal.
- Do not use a cracked or damaged probe. In this event, call your field service representative immediately to obtain a replacement.
- Avoid pulling, pinching or kinking the probe cable, since a damaged cable may compromise the electrical safety of the probe.
- To avoid the risk of a probe accidentally falling, do not allow the probe cables to become entangled, or to be caught in the machine's wheels.
- Never immerse the probe connector or adapter into any liquid.

NOTE: For detailed information on handling probes, refer to the Voluson i / Voluson e Basic User Manual and the care card supplied with the probe.

1-3-5 Auxiliary Devices Safety

⚠ **WARNING** ***Power Supplies for additional equipment MUST comply with IEC 60601-1.***

⚠ **WARNING** ***DO NOT attempt to use different peripherals and accessories (brand and model; connected via the PCMCIA or USB ports) other than approved and provided by GE!***
The ultrasound system is an extremely sensitive and complex medical system.
Any unauthorized peripherals may cause system failure or damage!

The IEC 60601-1-1 standard provides a guideline for safely interconnecting medical devices in systems. "Equipment connected to the analog or digital interface must comply with the respective IEC/UL standards (e.g. IEC 60950 / UL 60950 for data processing equipment and IEC 60601-1 / UL 60601-1 for medical equipment). Everybody who connects additional equipment to the signal input portion or signal output portion configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1-1.

⚠ **WARNING** ***For Ethernet connection, a separation device has to be used.***

Special care has to be taken, if the device is connected to computer network (e.g., Ethernet), because other devices could be connected without any control. There could be a potential difference between the protective earth and any line of the computer network including the shield.

In this case the only way to operate the system safely is to use an isolated signal link with minimum 4mm creepage distance, 2.5mm air clearance of the isolation device. For computer networks there are media converters available which convert the electrical to optical signals. Please consider that this converter has to comply with IEC xxx standards* and is battery operated.

* IEC xxx stands for standards such as:

- IEC 60601 for medical devices
- IEC 60950 for information technology equipment etc.

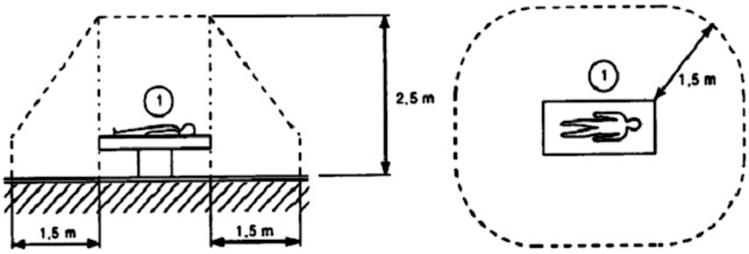
⚠ **NOTICE** Internally powered, applied parts type BF according to IEC60601-1 including national deviations
Information for service personnel:
For safety test without AC-mains connection (battery operated): apply Class II limits for electrical safety test of Voluson i/e (e.g. NC (normal condition) 100µA touch-current acc. IEC60601-1)
For safety test with AC-mains connection (by AC/DC adapter or Voluson Station/Cart): apply Class I limits for electrical safety test of Voluson i/e (e.g. NC (normal condition) 500µA earth-leakage-current, 100µA enclosure leakage current, 100µA touch-current; SFC (single fault condition, like open PE or open L/N) 1000µA earth-leakage-current, 500µA enclosure leakage current, 500µA touch-current; acc. IEC60601-1); Do not perform ground continuity test on accessible conducting parts of the Voluson i/e. These parts are either isolated (floating) or connected to functional earth but not protective earth, i.e. the connection is not designed to withstand 25A ground continuity test and can damage the Voluson i/e. Always observe national applicable regulations which might require different limits

⚠ **NOTICE** **The system integrator** (any person connecting the medical device to other devices) **is responsible that the connections are safe.**
If in doubt, consult the technical service department or your local representative.

⚠ **CAUTION** **The leakage current of the entire system including any / all auxiliary equipment must not exceed the limit values as per EN 60601-1-1:1990 (IEC 60601-1-1) respectively other valid national or international standards. All equipment must comply with UL, CSA and IEC requirements.**

1-3-5 Auxiliary Devices Safety (cont'd)

CAUTION **Please observe that some printers may not be medical devices! If the Bluetooth Printer and/or Line Printers are no medical devices, they have to be located outside of the patient environment (according to IEC 60601-1 / UL 60601-1).**


①
2,5 m
1,5 m
1,5 m
①
1,5 m

CAUTION **Auxiliary equipment must only be connected to the main console with the special main outlet provided for the electrical safety of the system.**

CAUTION **Auxiliary equipment with direct main connection requires galvanic separation of the signal and/or control leads.**

For hardware installation procedures see: Chapter 3 - Connection of Auxiliary Devices on page 3-23.

WARNING ***After each installation, the leakage currents have to be measured according to IEC 60601-1 respectively UL 60601-1 (see: Section 10-7-2 on page 10-13).***

NOTICE When the Voluson i / Voluson e scanner is used with the Cart:
- make sure the voltage jumper on the isolation transformer of the Cart is in the correct position.
- all peripherals mounted on the Cart should be firmly secured in position using straps.
- use only the on board power outlets from transformer and USB ports of Voluson i / Voluson e to connect devices.

1-3-6 Label Location

The Voluson i / Voluson e ultrasound system comes equipped with product labels and icons. These labels and icons represent pertinent information regarding the operation of the unit.

BT Version: Product labels and its location depend on BT-version and/or date of manufacture. Refer to Section 1-2-3 on page 1-5 and Chapter 2 in the Basic User Manual of your system.

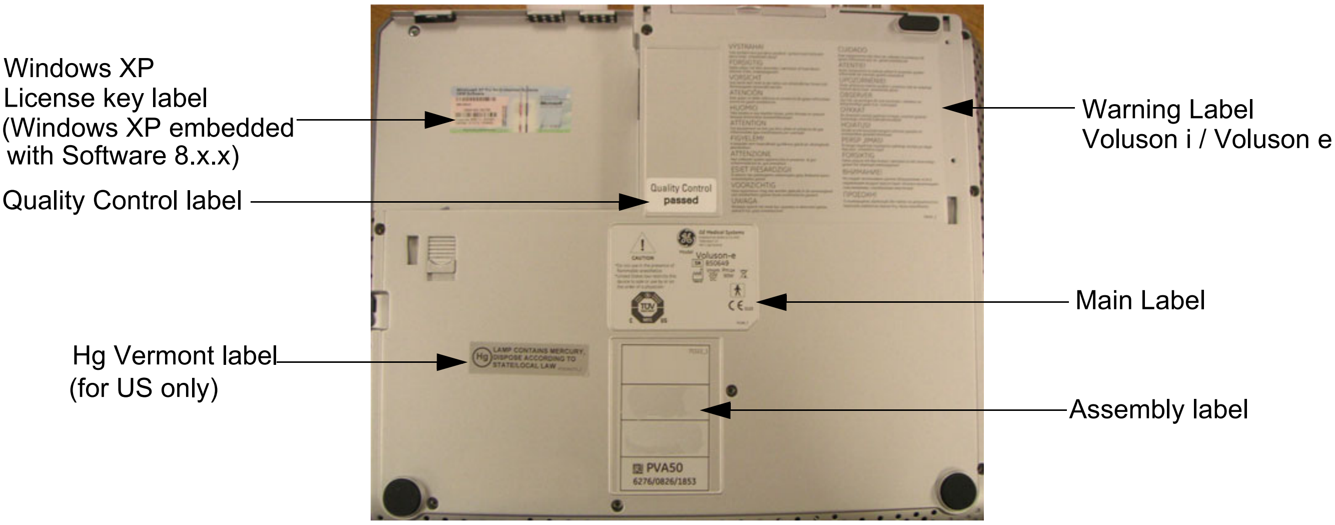

Windows XP License key label (Windows XP embedded with Software 8.x.x)
Quality Control label
Hg Vermont label (for US only)
Warning Label Voluson i / Voluson e
Main Label
Assembly label
Quality Control passed
PVA50

Figure 1-1 Labeling (on base of the Voluson i / Voluson e system)

1-3-6-1 Main Label on Voluson i / Voluson e system

The Main Label is located on the base of the Voluson i / Voluson e system.

BT Version: *The layout of the Identification and Rating Plate depends on BT-version and/or date of manufacture.*

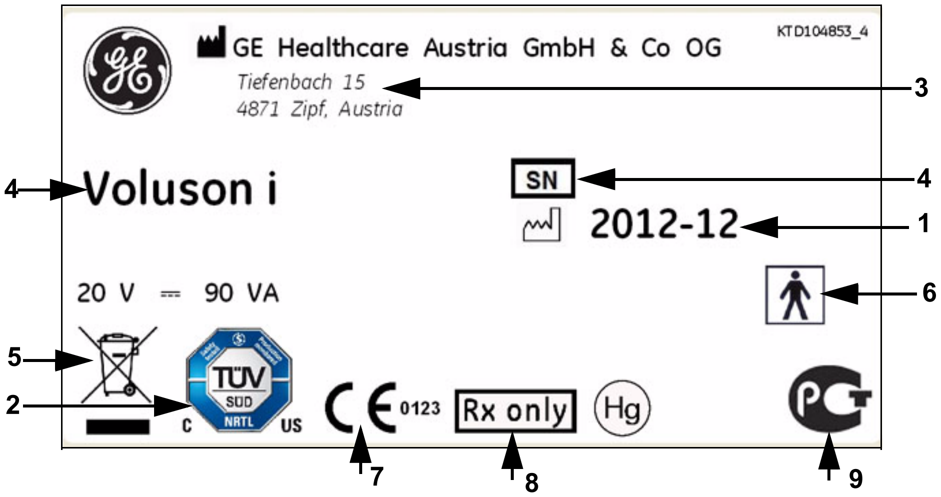

GE Healthcare Austria GmbH & Co OG
Tiefenbach 15
4871 Zipf, Austria
KTD104853_4
Voluson i
SN
2012-12
20 V ⎓ 90 VA
TÜV SÜD NRTL
C
US
CE 0123
Rx only
Hg
1
2
3
4
4
5
6
7
8
9

Figure 1-2 Main Label (located on the base of the system, e.g., Voluson e)

- **1 Manufacturing date**
- **2 TÜV NRTL Classified**
- **3 Manufacturer**
- **4 Model type and Serial number**
- **5 WEEE Disposal Icon**
- **6 Safety type: Type BF**
- **7 CE marking**
- **8 FDA Guidance document**
- **9 GHOST R label**

1-3-6-2 Main Label on optional Modo Cart

The Main Label is located on the back of the Modo Cart.

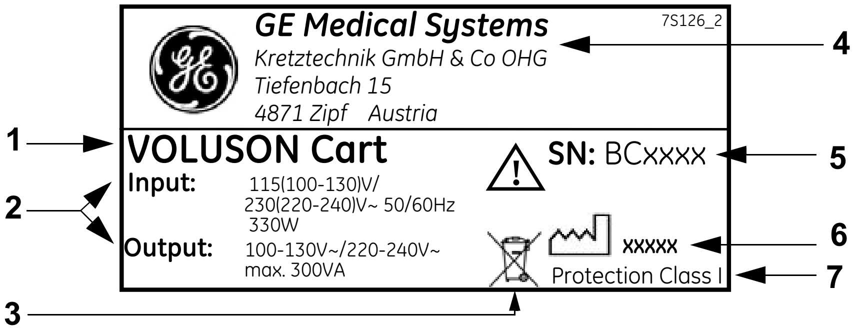

GE Medical Systems
Kretztechnik GmbH & Co OHG
Tiefenbach 15
4871 Zipf Austria
7S126_2
VOLUSON Cart
Input: 115(100-130)V/
230(220-240)V~ 50/60Hz
330W
Output: 100-130V~/220-240V~
max. 300VA
SN: BCxxxx
xxxxx
Protection Class I
1
2
3
4
5
6
7

Figure 1-3 Main Label (located on back of the Modo Cart)

- **1 Model Type**
- **2 Input/Output Specification**
- **3 WEEE Disposal Icon**
- **4 Manufacturer**
- **5 Serial number**
- **6 Manufacturing date**
- **7 Protection Class**

1-3-6-3 Main Label on optional Dock Cart

The Main Label is located on the back of the Dock Cart.

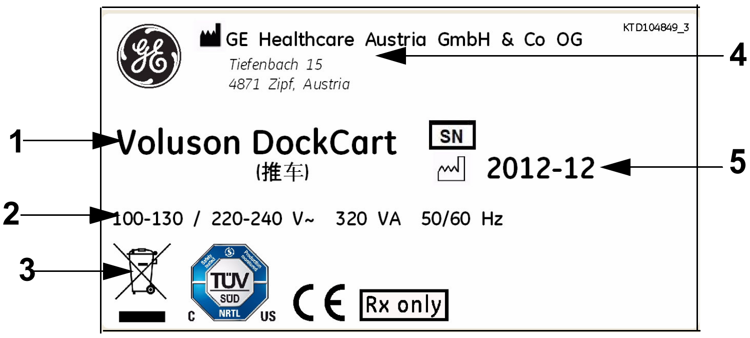

GE Healthcare Austria GmbH & Co OG
Tiefenbach 15
4871 Zipf, Austria
KTD104849_3
Voluson DockCart
(推车)
SN
2012-12
100-130 / 220-240 V~ 320 VA 50/60 Hz
TÜV SÜD NRTL
C US
CE
Rx only
1
2
3
4
5

Figure 1-4 Main Label (located on back of the Dock Cart)

1 Model Type

2 Input Specification

3 WEEE Disposal Icon

4 Manufacturer

5 Manufacturing date

1-3-6-4 Main Label on optional Voluson Station

The Main Label is located on the back of the Voluson Station.

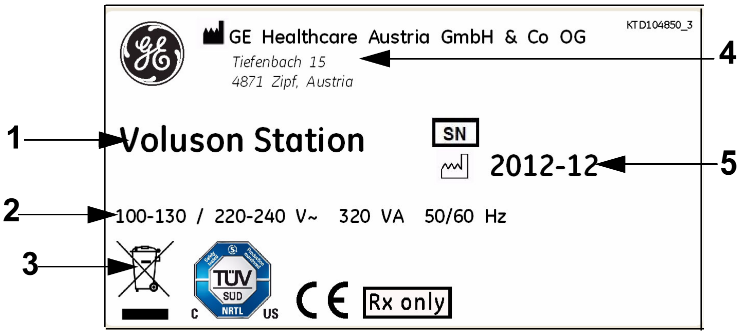

GE Healthcare Austria GmbH & Co OG
Tiefenbach 15
4871 Zipf, Austria
KTD104850_3
Voluson Station
SN
2012-12
100-130 / 220-240 V~ 320 VA 50/60 Hz
TÜV SÜD NRTL
C US
CE
Rx only
1
2
3
4
5

Figure 1-5 Main Label (located on back of the Voluson Station)

1 Model Type

2 Input Specification

3 WEEE Disposal Icon

4 Manufacturer

5 Manufacturing date

1-3-7 Dangerous Procedure Warnings

Warnings, such as the examples below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

⚠ **DANGER** **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT.**
USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

⚠ **WARNING** ***EXPLOSION WARNING***

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE.
OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

⚠ **WARNING** ***DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT***

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

⚠ **WARNING** ***Use only batteries approved by GE as suitable for the Voluson i / Voluson e portable ultrasound system. In addition to Section 1-3-8 "Voluson i / Voluson e Battery Safety" on page 1-14, READ all safety precautions that come from the battery and battery charger manufacturers.***

1-3-8 Voluson i / Voluson e Battery Safety

NOTE: The Voluson i / Voluson e system is supplied with a lithium ion battery in the battery bay, as standard.

The lithium ion battery provides power when an AC power source is not available. Lithium ion batteries last longer than conventional batteries and do not require replacement as often. You can expect one hour of battery life with a single, fully-charged battery.

The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such a watch batteries). Used batteries should not be placed with common household waste products. Contact local authorities for the location of a chemical waste collection program nearest you.

NOTE: Regulations vary for different countries. Dispose of a used battery in accordance with local regulations.

⚠ **CAUTION** **Use only batteries approved by GE as suitable for use with the Voluson i / Voluson e portable ultrasound system.**

⚠ **WARNING** ***The Voluson i / Voluson e battery has a safety device.***
DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY!

Always observe following precautions:

1-3-8 Voluson i / Voluson e Battery Safety (cont'd)

- Charge batteries only when the ambient temperature is between 0° and 65° C (32° and 149° F). and discharge the batteries between -10° and 55° C (14° and 131° F).
- Do not short-circuit the battery by directly connecting the negative terminals with metal objects.
- Do not heat the battery or discard it in a fire.
- Do not expose the battery to temperatures over 60° C (140° F). Keep the battery away from fire and other heat sources.
- Do not charge the battery near a heat source, such as, a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not pierce the battery with a sharp object, hit it, or step on it.
- Do not use a damaged battery.
- Do not apply solder to a battery.
- Do not connect the battery to an electrical power outlet.

WARNING ***In the event that the Voluson i / Voluson e system will not be used for a long period, it is necessary to remove the battery from the system while not in use.***

CAUTION **To prevent the battery bursting, igniting, or fumes from the battery causing equipment damage, always observe the following precautions:**

- Do not immerse the battery in water or allow it to get wet.
- Do not place the battery into a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, ***immediately remove it and stop using it***.
- If you have any questions about the battery, consult your local GE representative.
- Storage of the battery pack:

  Short term (less than 1 month): between 0° C (32° F) and 50° C (122° F).

  Long-term (more than 3 months): between 10° C (50° F) and 35° C (95° F).

For further details refer to Chapter 3 - Internal Lithium Ion Battery on page 3-73.

NOTICE When storing a battery pack for more than 6 months, it is necessary to charge the battery pack at least once every 6 months in order to prevent leakage and deterioration in performance (as a result of self-discharging).

NOTICE When charging the battery for the first time after long-term storage, recover the battery pack to original performance through repeating several cycles of full charging and discharging.

NOTE: When shipped, the Voluson i / Voluson e battery is in a state of being approximately 30% charged. Before use, it is necessary to fully charge and discharge the battery pack up to 3 times, in order to utilize Li-Ion smart packs.

1-3-9 Lockout/Tagout Requirements (For USA Only)

Follow OSHA Lockout/Tagout requirements to protect service personnel from injuries caused by unexpected energizing or start-up of equipment during service, repair, or maintenance.

NOTICE Energy Control and Power Lockout for Voluson i / Voluson e.

TAG
&
LOCKOUT
Signed
Date

When servicing parts of the system where there is exposure to voltage greater than 30 Volts:
Unplug the system
Maintain control of the system power plug
Remove Battery
There are no test points to verify isolation, you must wait for at least 20 seconds for capacitors to discharge.

Beware that the Power Supply, Front End Processor and Back End Processor may be energized even if the power is turned off when the cord is still plugged into the AC Outlet.

1-3-10 Returning/Shipping Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items what were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purpose and must be transported as a hazardous material.

Section 1-4
Electromagnetic Compatibility (EMC)

1-4-1 What is EMC?

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due interference from its environment or when the device produces unacceptable levels of emission to its environment. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power of signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

For applicable standards refer to Chapter 2 in the Basic User Manual.

1-4-2 Compliance

The Voluson i / Voluson e unit conforms to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements as mentioned in IEC 60601-1-2.

NOTE: ***For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh, clamps, are in good condition, installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.***

1-4-3 Electrostatic Discharge (ESD) Prevention

WARNING ***Do not touch any boards with integrated circuits prior to taking the necessary ESD precautions:***

1.) When installing boards, ESD may cause damage to a board. ALWAYS connect yourself, via an arm-wrist strap, to any exposed metal part of the system.

2.) Follow general guidelines for handling of electrostatic sensitive equipment.

WARNING ***Risk of electrical shock: System must be turned off and Battery has to be removed. Avoid all contact with electrical contacts, conductors and components.***
Always use non-conductive handles designed for the removal and replacement of ESD sensitive parts. All parts that have the potential for storing energy must be discharged or isolated before making contact.

Section 1-5
Customer Assistance

1-5-1 Contact Information

If this equipment does not work as indicated in this Service Manual or in the Basic User Manual, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

NOTE: *Prepare vital system information (see: Section 7-2 on page 7-2) before you call:*

- System Type
- System Serial number (also visible on label on back of the system)
- Application Software version
- Backup version
- additional information about installed software

Table 1-6 Phone numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Medical Systems Ultrasound Service Engineering 9900 Innovation Drive (RP-2123) Wauwatosa, WI 53226, USA	Service: On-site Service Parts Applications Support	1-800-437-1171 1-800-558-2040 1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Applications Support	1-800-321-7937 1-262-524-5698
Europe GE Ultraschall Deutschland GmbH Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	OLC - EMEA (Europe, Middle East & Africa) Phone: +49 (0)212 2802 - 652 (OLC) +33 1 3083 1300 (English/German all segments incl. training)	
Online Services Ultrasound Asia Australia China India Japan Korea Singapore	Phone: +(61) 1-800-647-855 +(86) 800-810-8188 +(91) 1800-425-8025 +(81) 42-648-2940 +(82) 2620 13585 +(95) 6277-3444	

1-5-2 System Manufacturer

Table 1-7 System Manufacturer

Manufacturer	Telephone	FAX
GE Healthcare Austria GmbH & Co OG Tiefenbach 15 A-4871 Zipf Austria	+43 (0) 7682-3800-0	+43 (0) 7682-3800-47

Chapter 2
Site-Preparation

Section 2-1
Overview

2-1-1 Purpose of Chapter 2

This chapter provides the information required to plan and prepare for the installation of a Voluson i / Voluson e ultrasound unit.
Included are descriptions of the facility and electrical needs to be met by the purchaser.

Table 2-1 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	General Console Requirements	2-1
2-3	Facility Needs	2-5

Section 2-2
General Console Requirements

2-2-1 Environmental Requirements

Table 2-2 Environmental Requirements

Operating Temperature	Operating Humidity	Heat Dissipation	Storage Temperature	Storage Humidity	Air Pressure
10 to 30°C (50 to 86°F)	30 to 80% rH non-condensing	300 BTU pr hour	-10 to 40 °C (14 to 104°F)	< 90% rH non-condensing	700 - 1060 hPa

CAUTION If the system has been in storage or has been transported, please see the acclimation requirements *before* powering ON and/or using the system. See *”Installation Warnings” on page 3-2*

2-2-1-1 Cooling

The cooling requirement for the Voluson i / Voluson e is 300 BTU/hr. This figure does not include cooling needed for lights, people, or other equipment in the room.

NOTE: Each person in the room places an additional 300 BTU/hr demand on the cooling system.

2-2-1-2 Lighting

Bright light is needed for system installation, updates and repairs. However, operator and patient comfort may be optimized if the room light is subdued and indirect. Therefore a combination lighting system (dim/bright) is recommended. Keep in mind that lighting controls and dimmers can be a source of EMI which could degrade image quality. These controls should be selected to minimize possible interference.

2-2-2 Electrical Requirements

GE Healthcare requires a dedicated power and ground for the proper operation of its Ultrasound equipment. This dedicated power shall originate at the last distribution panel before the system.

Sites with a main power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size Ground wire from the distribution panel to the Ultrasound outlet.

Sites with a main power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size Ground wire from the distribution panel to the Ultrasound outlet.

NOTE: Please note that image artifacts can occur, if at any time within the facility, the Ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

2-2-2-1 Voluson i / Voluson e Power Requirements

The Voluson i / Voluson e is powered either by its internal battery or by a separate power supply adapter unit connected to a separate outlet for any range of 100 - 250 VAC, 47-63 Hz.

Table 2-3 Electrical Specifications for Voluson i / Voluson e

Adaptor	Input Voltage	Output Voltage	Tolerances	Op. Current	Frequency
AC DC converter	100V AC to 250V AC	20V	±10%	6A	47-63 Hz

2-2-2-2 Inrush Current

Inrush current is not a factor for consideration, due to the inrush current limiting properties of the power supplies.

2-2-2-3 Site Power Outlets

A dedicated AC power outlet must be within reach of the unit without extension cords. Other adequate outlets for the external peripherals, medical and test equipment needed to support this unit must also be present within 1 m (3.2 ft.) of the unit. Electrical installation must meet all current local, state, and national electrical codes.

2-2-2-4 Main Power Plug

The Voluson i / Voluson e portable ultrasound system is supplied with a main power plug, as standard. In the event that the unit arrives without a power plug, or with the wrong plug, contact your GE dealer. When necessary, the installation engineer will supply the appropriate power plug to meet the applicable local regulations.

2-2-2-5 Power Stability Requirements

- **Voltage drop-out**

Max 10 ms.

- **Power Transients**

(All applications)

Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-3 EMI Limitations

Ultrasound systems are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. Ultrasound machines also generate EMI. The Voluson i / Voluson e complies with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

NOTICE Possible EMI sources should be identified before the unit is installed, and should not be on the same line as the ultrasound system. A dedicated line should be used for the ultrasound system.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. Sources of EMI include the following:

- medical lasers
- scanners
- cauterizing guns
- computers
- monitors
- fans
- gel warmers
- microwave ovens
- portable phones
- broadcast stations and mobile broadcasting machines

Table 2-4 EMI Prevention/ Abatement

EMI Rule	Details
Be aware of RF sources.	Keep the unit at least 5m (16.4 ft) away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Ground the unit.	Poor grounding is the most likely reason a unit will have noisy images. Check grounding of the power cord and power outlet.
Replace and/or reassemble all screws, RF gaskets, covers and cores.	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of the card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets.	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn ON the unit until any loose metallic part is removed and replaced, if required.
Do not place labels where RF gaskets touch metal.	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. In case a label has been found in such a location, move the label to a different, appropriate location.
Use GE-specified harnesses and peripherals.	The interconnect cables are grounded and require ferrite beads and other shielding. Cable length, material, and routing are all important; do not make any changes that do not meet all specifications.
Take care with cellular phones.	Cellular phones may transmit a 5 V/m signal that causes image artifacts.
Properly address peripheral cables.	Do not allow cables to lie across the top of the system. Loop any peripheral cable excess length into one bundle.

2-2-4 Probe Environmental Requirements

Operation: Ambient temperature 18° to 30° C

Storage: -10° to 50° C

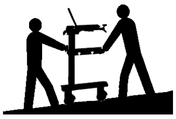
NOTE: Temperature in degrees C. Conversion to degrees F = °C (9/5) + 32).

NOTICE SYSTEMS AND ELECTRONIC PROBES ARE DESIGNED FOR STORAGE TEMPERATURES OF -10 TO + 50 degrees C. WHEN EXPOSED TO LARGE TEMPERATURE VARIATIONS, THE PRODUCT SHOULD BE KEPT IN ROOM TEMPERATURE FOR 10 HOURS BEFORE USE.

2-2-5 Time and Manpower Requirements

Site preparation takes time. Begin Site preparation checks as soon as possible. If possible, allow six weeks before delivery, for enough time to make necessary changes.

CAUTION



**Only one person is required to unpack the Voluson i / Voluson e ultrasound unit.
At least two people must be available to unpack the Cart.
Attempts to move the Cart considerable distances (or on an incline) by one person alone, could result in personal injury, and/or damage to the system.**

2-2-6 System Specifications

2-2-6-1 Physical Dimensions of Voluson i / Voluson e

The physical dimensions of the Voluson i / Voluson e unit are summarized in Table 2-5.

Table 2-5 Physical Dimensions of Voluson i / Voluson e

Height	Width	Depth	Weight (without peripherals)
59 cm / 2.3 inches	358 mm / 14.2 inches	313 mm / 12.4 inches	5 kg / 11 lbs.

2-2-6-2 Acoustic Noise Output

max. 45 dB(A)

2-2-6-3 Electrical Specifications

Please refer to Section 2-2-2-1 "Voluson i / Voluson e Power Requirements" on page 2-2.

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials needed to prepare the site is the responsibility of the purchaser. Delay, confusion, and waste of manpower can be avoided by completing pre installation work before delivery.

Use the Pre-installation checklist (provided in Table 2-6) to verify that all needed steps have been taken.

Table 2-6 Voluson i / Voluson e Pre-Installation Check List

Action	Yes	No
Schedule at least 3 hours for installation of the system.		
Notify installation team of the existence of any variances from the basic installation.		
Make sure system and probes have been subject to acclimation period.		
Environmental cooling is sufficient.		
Lighting is adjustable to adapt to varying operational conditions of the scanner.		
Electrical facilities meet system requirements.		
EMI precautions have been taken and all possible sources of interference have been removed.		
Mandatory site requirements have been met.		
If a network is used, be sure to have all applicable Network information (IP addresses, AE Title, Port Number, etc.) and a dedicated network outlet is available.		

Purchaser responsibility includes:

- Procuring the materials required.
- Completing the preparations before delivery of the ultrasound system.
- Paying the costs for any alterations and modifications not specifically provided in the sales contract.

NOTE: *All electrical installations that are preliminary to the positioning of the equipment at the site prepared for the equipment must be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must only utilize qualified personnel to perform electrical servicing on the equipment.*

The desire to use a non–listed or customer provided product or to place an approved product further from the system than the interface kit allows presents challenges to the installation team. To avoid delays during installation, such variances should be made known to the individuals or group performing the installation at the earliest possible date (preferably prior to the purchase).

The ultrasound suite must be clean prior to delivery of the machine. Carpet is not recommended because it collects dust and creates static. Potential sources of EMI (electromagnetic interference) should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Mandatory Site Requirements

The following are mandatory site requirements. Additional (optional) recommendations, as well as a recommended ultrasound room layout, are provided in Section 2-3-3 "Site Recommendations" .

- A dedicated single branch power outlet of adequate amperage (see Table 2-3 on page 2-2) that meets all local and national codes and is located less than 2.5 m (8.2 ft) from the unit's proposed location. Refer to: Section 2-2-2 "Electrical Requirements" on page 2-2.
- A door opening of at least 76 cm (2.5 ft) in width (if using the Cart).
- The proposed location for the unit is at least 0.2 m (0.67 ft) from the walls, to enable cooling.
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.
- Power outlets for other medical equipment and gel warmer.
- Power outlets for test equipment within 1 m (3.3 ft) of the ultrasound unit.
- Clean and protected space for storage of probes (either in their case or on a rack).
- Material to safely clean probes (performed using a plastic container, never metal).
- In the case of a network option:
    - An active network outlet in the vicinity of the ultrasound unit.
    - A network cable of appropriate length (regular Pin-to-Pin network cable).
    - An IT administrator who will assist in configuring the unit to work with your local network. A fixed IP address is required. Refer to the form provided in Figure 3-141 on page 3-120 for network details that are required.

NOTE: All relevant preliminary network port installations at the prepared site must be performed by authorized contractors. The purchaser of GE equipment must utilize only qualified personnel to perform servicing of the equipment.

2-3-3 Site Recommendations

The following are (optional) site recommendations. Mandatory site requirements are provided in the *Mandatory Site Requirements* section, above.

- Door opening of 92 cm (3 ft) in width (if using the Cart).
- Accessible circuit breaker for a dedicated power outlet.
- Sink with hot and cold running water.
- Receptacle for bio–hazardous waste, for example, used probe sheaths.
- Emergency oxygen supply.
- Storage area for linens and equipment.
- Nearby waiting room, lavatory, and dressing room.
- Dual level lighting (bright and dim).
- Lockable cabinet for software and manuals.

2-3-3-1 Recommended Ultrasound Room Layout

Figure 2-1 shows a floor plan illustrating the recommended layout of the Ultrasound Room and depicting the minimal room layout requirements.

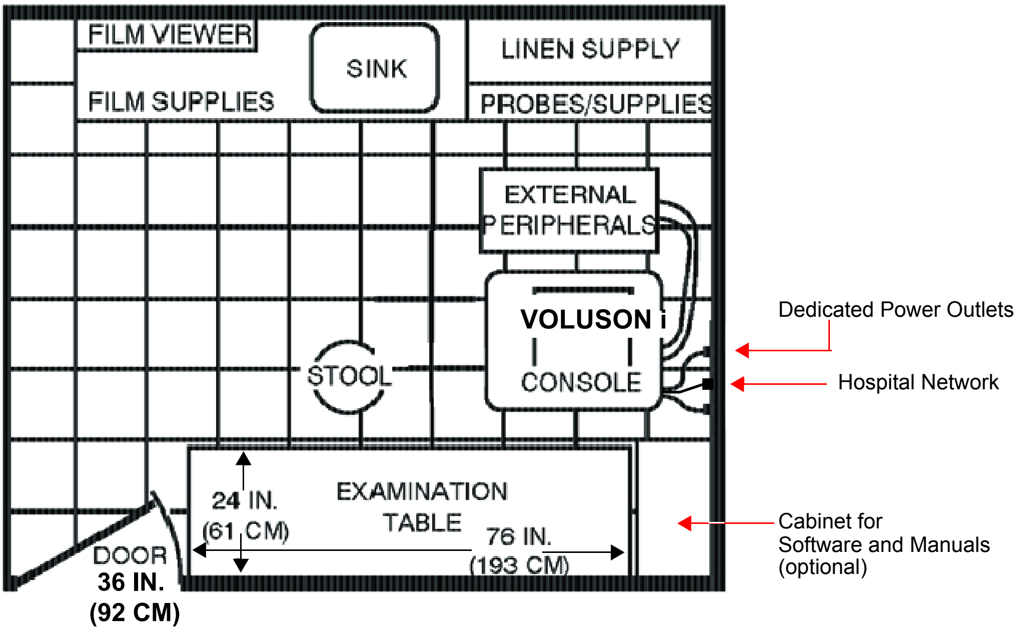

FILM VIEWER
SINK
LINEN SUPPLY
FILM SUPPLIES
PROBES/SUPPLIES
EXTERNAL PERIPHERALS
VOLUSON i CONSOLE
STOOL
Dedicated Power Outlets
Hospital Network
24 IN. (61 CM)
EXAMINATION TABLE
76 IN. (193 CM)
Cabinet for Software and Manuals (optional)
DOOR
36 IN.
(92 CM)

Figure 2-1 Recommended Floor Plan 4.3m x 5.2m (14ft x 17ft)

2-3-4 Networking Setup Requirements

2-3-4-1 Stand-alone Unit (without Network Connection)

None

2-3-4-2 Unit Connected to Hospital’s Network

Supported networks:

- Ethernet
- Wireless LAN

2-3-4-3 Purpose of the DICOM® Network Function

DICOM® (**D**igital **I**maging and **Co**mmunications in **M**edicine) services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM® services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues.
With DICOM®, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-4-4 DICOM® Option Pre-installation Requirements

To configure the Voluson i / Voluson e ultrasound unit to work with other network connections, the network administrator must provide some necessary information.

Use the Connectivity Setup Worksheet on page 3-119 to record required information that must include:

• Voluson i / Voluson e Details:	DICOM® network details for the Voluson i / Voluson e unit, incl. the host name, local port, IP address, AE title and net mask.
• Routing Information:	IP addresses for the default gateway and other routers in use at the site.
• DICOM® Application Information:	Details of DICOM® devices in use at the site, including the DICOM® host name, AE title, DICOM® port number and IP addresses.

Installation see: Section 3-12 "Network IP Address Configuration" on page 3-116.

Chapter 3
Setup Instructions

Section 3-1
Overview

3-1-1 The Purpose of Chapter 3

This chapter contains information needed to setup the Voluson i / Voluson e ultrasound unit. Included are procedures to receive, unpack and configure the equipment.

NOTE: Depending on the customer's specific requirements, the Voluson i / Voluson e may have been supplied with or without the Voluson Modo Cart, Dock Cart or Voluson Station (optional).

A worksheet is provided (see: page 3 - 119 to page 3 - 120) to help ensure that all the required information is available, prior to setup the system.

Table 3-1 Contents in Chapter 3

Section	Description	Page Number
3-1	Overview	3-1
3-2	Set Up Reminders	3-2
3-3	Receiving and Unpacking the Equipment	3-4
3-4	Preparing for Set Up	3-9
3-5	Connection of Auxiliary Devices	3-23
3-6	Completing the Set Up	3-68
3-7	Printer Installation	3-80
3-8	System Configuration	3-98
3-9	Available Probes	3-106
3-10	Software/Option Configuration	3-106
3-11	Connectivity Setup	3-107
3-12	Network IP Address Configuration	3-116
3-13	Connectivity Setup Worksheet	3-119
3-14	Paperwork	3-121

Section 3-2
Set Up Reminders

3-2-1 Average Installation Time

The Voluson i / Voluson e installation and functional checkout will take approximately one hour; Voluson i / Voluson e consoles with optional equipment may take slightly longer.

Once the site has been prepared, the average installation time required is shown in Table 3-2 below.

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	0.5 hours	
Installing the scanner / options / printers	0.5 - 1.5 hours	depends on required configuration
DICOM® Option (connectivity)	0.5 - 1.5 hours	depends on configuration amount

3-2-2 Installation Warnings

1.) The Voluson i / Voluson e portable ultrasound system weighs only 5 kg (11 lbs.), without peripherals. However since the Carts (incl. Voluson i / Voluson e and peripherals) weighs approximately 33 kg (72 lbs.), two persons are required to unpack it.

2.) There are no operator serviceable components. To prevent shock, do not remove any covers or panels. Should problems or malfunctions occur, unplug the power cord. **Only** qualified service personnel should carry out servicing and troubleshooting.

NOTE: *For information on shipping carton labels, refer to Figure 3-1 on page 3-3.*

3-2-2-1 System Acclimation Time

After being transported the Voluson i / Voluson e system may be very cold, or hot. It requires one hour for each 2.5°C increment if it's temperature is below 10°C or above 40°C.

⚠ CAUTION **Equipment damage possibility. Turning the system on without acclimation after arriving at site may cause the system to be damaged.**

Table 3-3 Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

3-2-3 Safety Reminders

DANGER **WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DO NOT TOUCH THE UNIT!**

CAUTION **Two people are required to unpack the optional Cart because of its weight.**
Two people are required whenever a part weighing 16kg (35 lbs.) or more must be lifted.

CAUTION **If the unit is very cold or hot, do NOT turn on its power until it has had sufficient time to acclimate to its operating environment.**

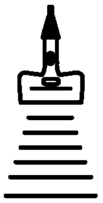
CAUTION **To prevent electrical shock, connect the unit to a properly grounded power outlet.**
Do NOT use a three to two prong adapter. This defeats safety grounding.

CAUTION **Do NOT wear the ESD wrist strap when you work on live circuits and more than 30 V peak is present.**

CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place, to ensure optimal system performance and cooling.**
(When covers are removed, EMI may be present).

CAUTION **OPERATOR MANUAL(S)**
The User Manual(s) should be fully read and understood before operating the Voluson i / Voluson e.
Keep manuals near the unit for reference.

CAUTION **ACOUSTIC OUTPUT HAZARD**
Although the ultrasound energy transmitted from the Voluson i / Voluson e portable ultrasound system is within FDA limitations, avoid unnecessary exposure.
Ultrasound energy can produce heat and mechanical damage.



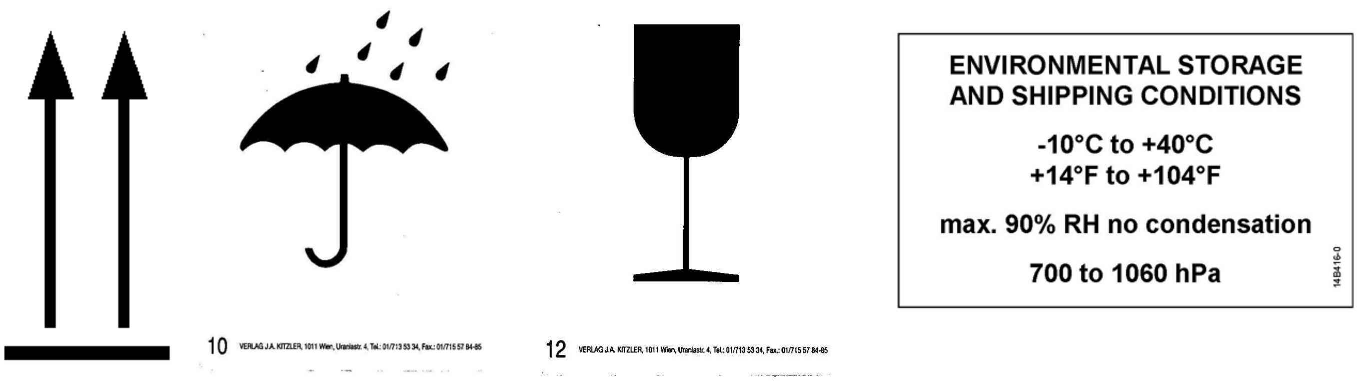

ENVIRONMENTAL STORAGE AND SHIPPING CONDITIONS
-10°C to +40°C
+14°F to +104°F
max. 90% RH no condensation
700 to 1060 hPa
14B416-0
10 VERLAG J.A. KITZLER, 1011 Wien, Uraniastr. 4, Tel.: 01/713 53 34, Fax.: 01/715 57 84-85
12 VERLAG J.A. KITZLER, 1011 Wien, Uraniastr. 4, Tel.: 01/713 53 34, Fax.: 01/715 57 84-85

Figure 3-1 Environmental Labels

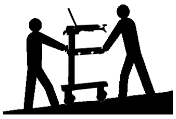
Section 3-3
Receiving and Unpacking the Equipment

CAUTION **Please read this section carefully before unpacking the Voluson i / Voluson e portable ultrasound system and its (optional) peripherals.**

The Voluson i / Voluson e ultrasound system, together with peripherals, probes, cables and accessories are shipped from the factory in a single durable shipping crate which is mounted on a raised wooden platform base - see Figure 3-3 on page 3-5.

If the optional Modo Cart, Dock Cart or Voluson Station has been ordered, this is shipped in a separate shipping crate.

CAUTION **Transport only with forklift or stacker truck.**
During transportation pay attention to the point of gravity.



Only one person is required to unpack the Voluson i / Voluson e ultrasound unit.

At least two people must be available to unpack the Modo Cart, the Dock Cart or the Voluson Station. Attempts to move the Cart considerable distances (or on an incline) by one person alone, could result in personal injury, and/or damage to the system.
Move the Cart forward or backward when going up or down inclines. Do not move the Cart sideways or diagonally.

Table 3-4 Shipping Cartons - Dimensions and Weights

Description	Height	Width	Depth	Weight*
Voluson i / Voluson e incl. peripherals and accessories	75 cm / 30 inch	93 cm / 37 inch	70 cm / 28 inch	50 kg / 110 lbs
Voluson - Modo Cart only	106 cm / 41.7 inch	75 cm / 29.5 inch	70 cm / 28 inch	58.5 kg / 129 lbs
Voluson - Dock Cart only	100 cm / 39,3 inch	63 cm / 24,8 inch	60 cm / 24 inch	59 kg / 130 lbs
Voluson Station only	91 cm / 35,8 inch	73 cm / 28,7 inch	69 cm / 27,1 inch	61 kg / 134 lbs

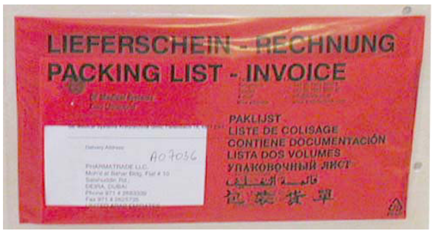
* Weight is approximate and will vary depending upon the supplied peripherals

NOTE: Before unpacking the unit, inspect the crate for visible damage.

NOTICE **The device must only be transported in the original packaging!**
Each shipping crate is sealed with cross-head screws. A Phillips 2 screwdriver is needed to open the crate. It is recommended to keep and store the shipping crate and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit (and/or Cart) has to be moved to a different location.

Unpack the devices such a way that packaging can be reused.
For warranty purposes, storage of the above is required for one year from date of purchase.

NOTICE If the shipping crate is damaged, please inform the GE sales representative immediately.



The envelope with delivery address, packing list and invoice is located on the front panel of the carton.

Check whether delivery is complete (according to packing list) and check visual damage!

Figure 3-2 envelope at front panel of the crate

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

3-3-1 Unpacking Procedure

1.) Loosen the screws and then remove the top cover from the crate.

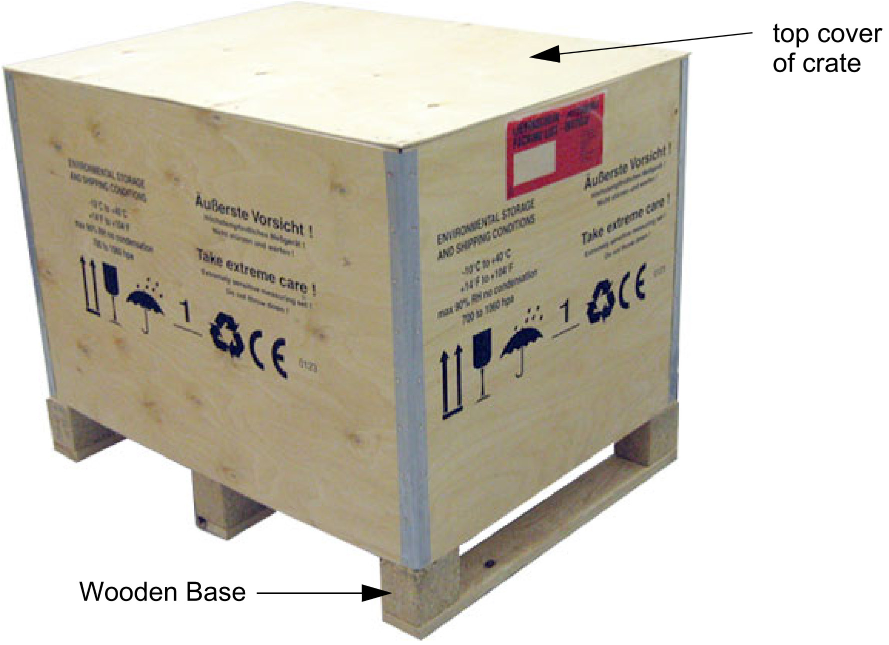


Figure 3-3 Shipping crate - Voluson i / Voluson e with Peripherals

CAUTION **When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.**

2.) Remove the packing slip (see: Figure 3-2) detailing the contents of the shipping crate and keep close to hand, ready to check whether delivery is complete (according to packing list).

3.) Remove the surface packing material (bubble packs, foam sections, silica gel, etc.).
Continue to remove additional packing material as applicable during the following procedure steps.

4.) Carefully remove the boxes containing the Voluson i / Voluson e scanner, peripherals, probes, etc. as well as the package containing further accessories (e.g. cables and software CD).

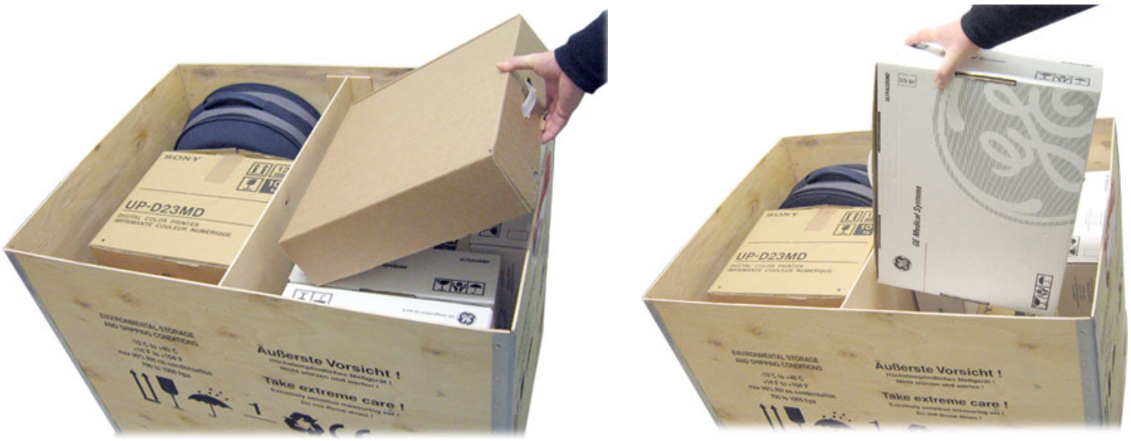


Figure 3-4 Shipping crate with Top open

5.) Before commencing the installation procedure, check visual damage!

3-3-2 Unpacking the Voluson i / Voluson e Modo Cart

1.) Cut the straps securing the shipping carton to the wooden base.

CAUTION **When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.**

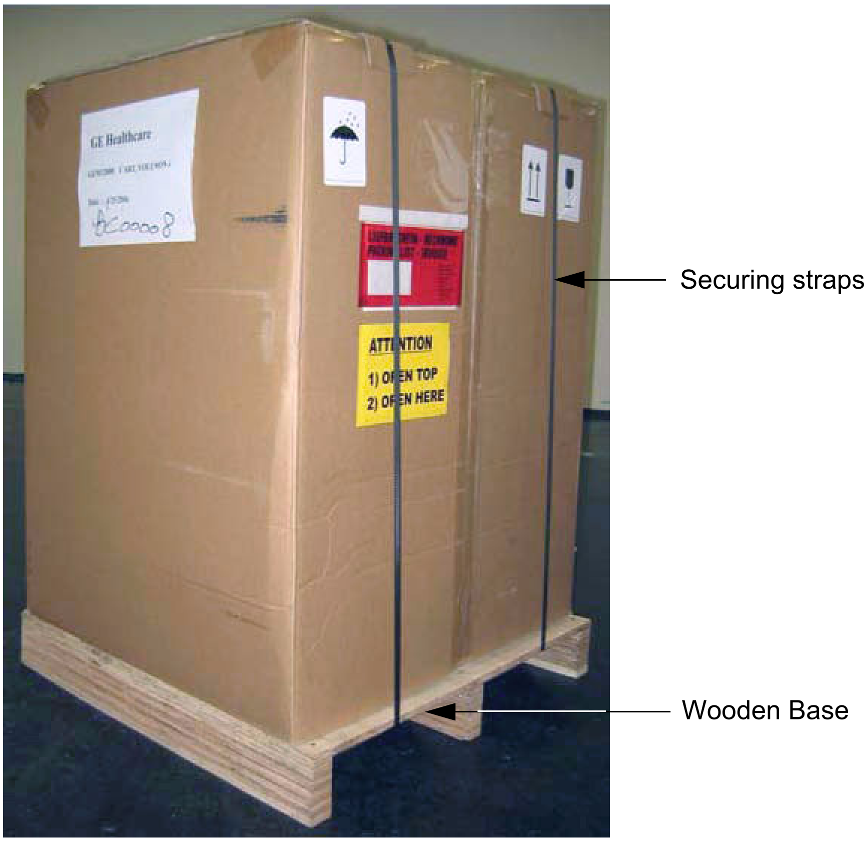


Figure 3-5 Shipping carton - Voluson Modo Cart

2.) Carefully cut the adhesive tape used to close the shipping carton and open the carton.

3.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand, ready to check whether delivery is complete (according to packing list).

4.) Remove the packing material in front of and surrounding the Modo Cart. Continue to remove additional packaging material as applicable during the following procedure steps.

5.) Using two people, carefully roll the Modo Cart down the unloading ramp to remove it completely from the shipping carton.

CAUTION

Have two people available to move the Modo Cart

Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage, or both.

Make sure the Modo Cart is standing firmly on the floor before applying the locking brake.

6.) Before commencing the installation procedure, check visual damage!

3-3-3 Unpacking the Voluson i / Voluson e Dock Cart

1.) Cut the straps securing the shipping carton to the wooden base.

CAUTION **When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.**

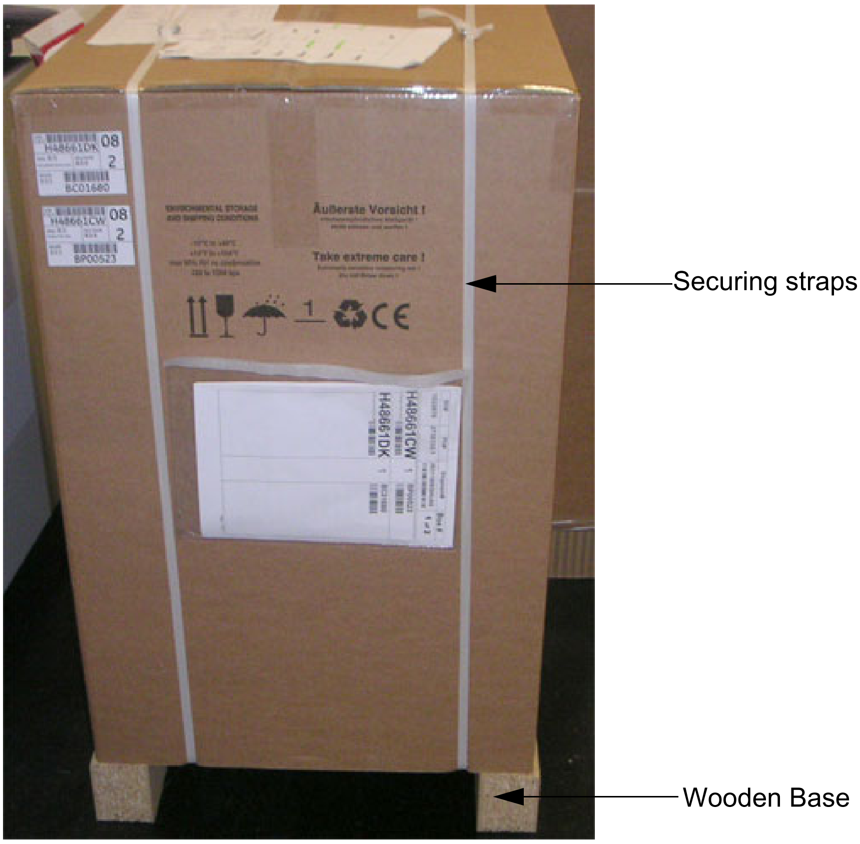


Figure 3-6 Shipping carton - Voluson Dock Cart

2.) Carefully cut the adhesive tape used to close the shipping carton and open the carton.

3.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand, ready to check whether delivery is complete (according to packing list).

4.) Remove the packing material in front of and surrounding the Dock Cart. Continue to remove additional packaging material as applicable during the following procedure steps.

5.) Using two people, carefully roll the Dock Cart down the unloading ramp to remove it completely from the shipping carton.

CAUTION

Have two people available to move the Dock Cart

Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage, or both.

Make sure the Dock Cart is standing firmly on the floor before applying the locking brake.

6.) Before commencing the installation procedure, check visual damage!

3-3-4 Unpacking the Voluson i / Voluson e Voluson Station

1.) Cut the straps securing the shipping carton to the wooden base.

CAUTION **When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.**

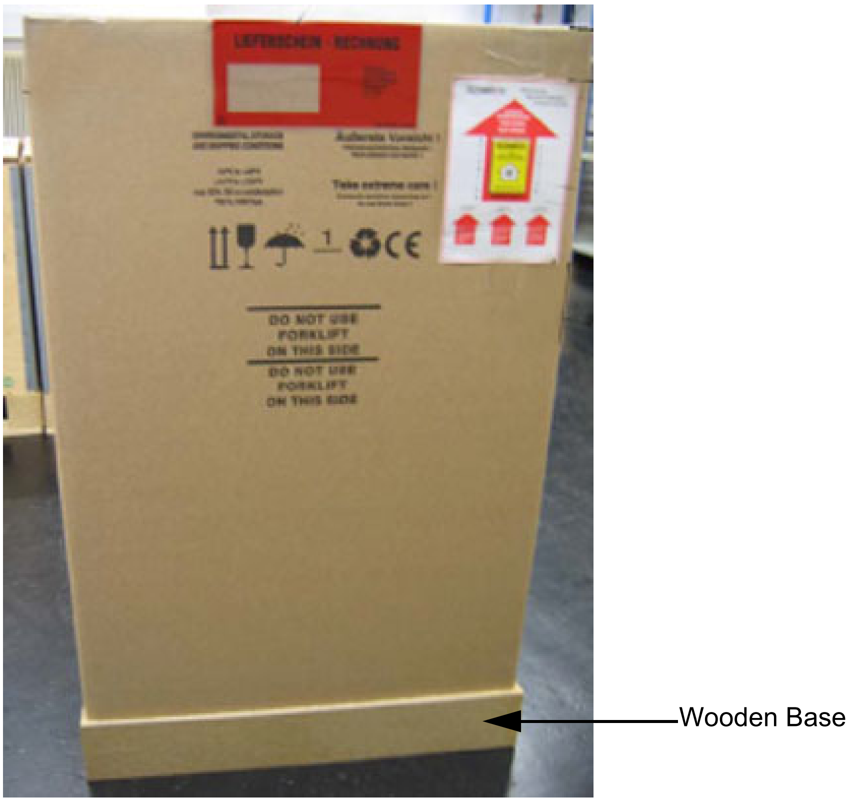

DO NOT USE FORKLIFT ON THIS SIDE
DO NOT USE FORKLIFT ON THIS SIDE
Wooden Base

Figure 3-7 Shipping carton - Voluson Station

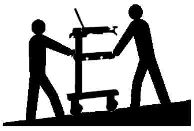
2.) Carefully cut the adhesive tape used to close the shipping carton and open the carton.

3.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand, ready to check whether delivery is complete (according to packing list).

4.) Remove the packing material in front of and surrounding the Voluson Station. Continue to remove additional packaging material as applicable during the following procedure steps.

5.) Using two people, carefully roll the Voluson Station down the unloading ramp to remove it completely from the shipping carton.

CAUTION



Have two people available to move the Voluson Station

Attempts to move the unit considerable distances or on an incline by one person could result in injury or damage, or both.

Make sure the Voluson Station is standing firmly on the floor before applying the locking brake.

6.) Before commencing the installation procedure, check visual damage!

Section 3-4
Preparing for Set Up

3-4-1 Verify Customer Order and Inspect Components

1.) After unpacking the equipment, it is important to verify that all items ordered by the customer have been received. Compare all items listed on the packing slip (delivery note) with those received.

⚠ **NOTICE** It is recommended to keep and store the shipping carton and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit has to be moved to a different location. Unpack the devices such a way that packaging can be reused.
For warranty purposes, storage of the above is required for one year from date of purchase.

2.) Visually inspect the system components using the following checklist.

Table 3-5 Damage Inspection Checklist - Voluson i / Voluson e System

✓	Step	Item	Recommended Procedure
	1	Main label	Enter **Serial Number:** __________________________ (printed on main label, see: Figure 1-2 on page 1-12)
	2	Console	Verify that the system is switched OFF and unplugged. Clean the console and control panel.
	3	Control Console	Physically inspect the control console for missing or damaged items. After switching on the system, verify the proper illumination of all the control panel buttons.
	4	Probes	Check all probes for wear and tear on the lens, cable, and connector. Look for bent or damaged pins on the connector and in the connector socket on the unit. Verify that the EMI fingers around the probe connector socket housing are intact. Check the probe locking mechanism and probe switch.
	5	LCD Display	Clean the LCD display by gently wiping with a dry, soft, lint-free non-abrasive folded cloth. Inspect the monitor for scratches and raster burn.
	6	Fans	Verify that the system's cooling fans and peripheral fans are operating.
	7	Rear Panel	Check the rear panel connectors for bent pins, loose connections and loose or missing hardware. Screw all the cable connectors tightly to the connector sockets on the panel. Verify that the labeling is in good condition.
	8	Covers	Check that all screws are tightly secured in place, that there are no dents or scratches and that no internal parts are exposed.
	9	Peripherals	Check and clean the peripherals in accordance with the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
	10	AC DC System	Check the AC DC unit is not damaged or cracked board and verify that the output cable is properly secured.
	11	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity. Replace the power cord, as required.

NOTE: Report any items that are missing, back-ordered, or damaged, to your GE sales representative. The contact address is shown in Contact Information on page 1-18.

3-4-1 Verify Customer Order and Inspect Components (cont'd)

- **Optional:** Visually inspect the Modo Cart components using the following checklist.

Table 3-6 Damage Inspection Checklist - Modo Cart (optional)

✓	Step	Item	Recommended Procedure
	1	Main label	Enter **Serial Number:** ___________________________ (printed on main label)
	2	Probe Holders	Clean the gel wells with warm water and a damp cloth to remove all traces of gel.
	3	Covers	Check that all screws are in place, all chassis and internal covers are installed.
	4	Transformer	Check the isolation transformer connectors and the associated cabling for good connection and proper insulation. **Japan only:** Exchange pull out protection of main power cord.
	5	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity.
	6	Front Castors	Check that the front castors can swivel, and can be placed in the locked position by pressing the foot brake lever n each castor.
	7	Rear Castors	Check that the rear castors can roll and swivel.
	8	Modo Cart Voltage	Verify that the voltage of the optional Modo Cart is correct. see: Section 3-4-3 "Modo Cart Voltage Configuration" on page 3-20

NOTE: *Report any items that are missing, back-ordered, or damaged, to your GE sales representative. The contact address is shown in Contact Information on page 1-18.*

- **Optional:** Visually inspect the Dock Cart components using the following checklist.

Table 3-7 Damage Inspection Checklist - Dock Cart (optional)

✓	Step	Item	Recommended Procedure
	1	Main label	Enter **Serial Number:** ___________________________ (printed on main label)
	2	Probe Holders	Clean the gel wells with warm water and a damp cloth to remove all traces of gel.
	3	Covers	Check that all screws are in place, all chassis and internal covers are installed.
	4	Transformer	Check the power supply connectors and the associated cabling for good connection and proper insulation. **Japan only:** Exchange pull out protection of main power cord.
	5	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity.
	6	Front Castors	Check that the front castors can swivel, and can be placed in the locked position by pressing the foot brake lever n each castor.
	7	Rear Castors	Check that the rear castors can roll and swivel.
	8	Dock Cart Voltage	Verify that the voltage of the optional Dock Cart is correct. see: Section 3-4-4 "Dock Cart / Dock Cart light / Voluson Station Voltage Configuration" on page 3-21

NOTE: *Report any items that are missing, back-ordered, or damaged, to your GE sales representative. The contact address is shown in Contact Information on page 1-18.*

3-4-1 Verify Customer Order and Inspect Components (cont'd)

- **Optional:** Visually inspect the Voluson Station components using the following checklist.

Table 3-8 Damage Inspection Checklist - Voluson Station (optional)

✓	Step	Item	Recommended Procedure
	1	Main label	Enter **Serial Number:** ____________________________ (printed on main label)
	2	Probe Holders	Clean the gel wells with warm water and a damp cloth to remove all traces of gel.
	3	Covers	Check that all screws are in place, all chassis and internal covers are installed.
	4	Transformer	Check the power supply connectors and the associated cabling for good connection and proper insulation. **Japan only:** Exchange pull out protection of main power cord.
	5	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity.
	6	Front Castors	Check that the front castors can swivel, and can be placed in the locked position by pressing the foot brake lever n each castor.
	7	Rear Castors	Check that the rear castors can roll and swivel.
	8	Voluson Station Voltage	Verify that the voltage of the optional Voluson Station is correct. see: Section 3-4-4 "Dock Cart / Dock Cart light / Voluson Station Voltage Configuration" on page 3-21

NOTE: Report any items that are missing, back-ordered, or damaged, to your GE sales representative. The contact address is shown in Contact Information on page 1-18.

3-4-1-1 Front and Side View of the Voluson i / Voluson e System

Figure 3-8 below shows the Voluson i / Voluson e portable ultrasound system components that are visible from the *front* and *side* of the ultrasound unit.

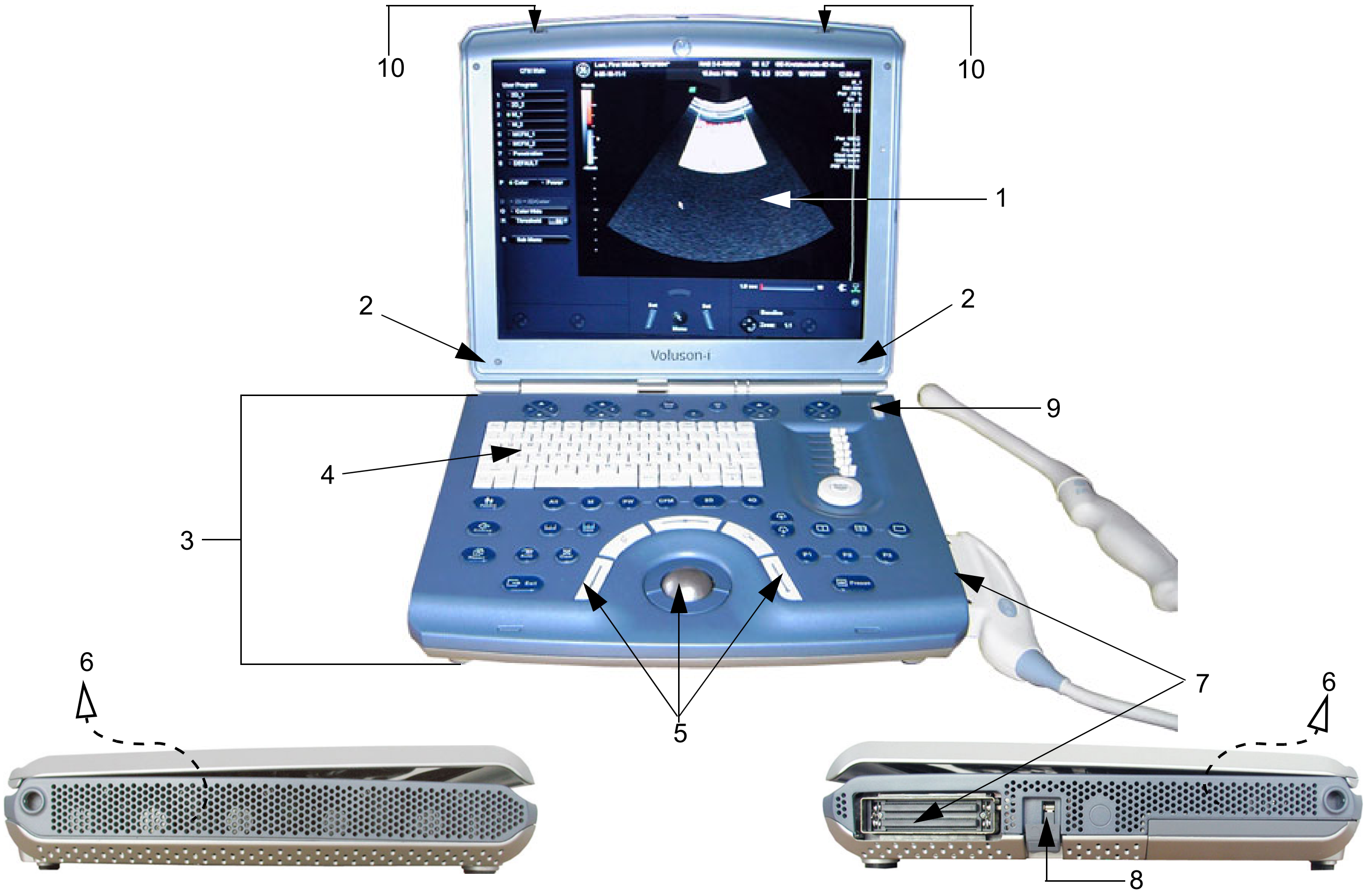


Figure 3-8 Front and Side View of the Voluson i / Voluson e

1	Display LCD Monitor: tilts up and down
2	Speakers: two loudspeakers for Doppler sound
3	Control Panel: contains TGC slider controls, trackball, alphanumeric keyboard and different buttons used to operate the Voluson i / Voluson e
4	Alphanumeric Keyboard (upper row of keys are assigned to ultrasound-specific functions)
5	Trackball and Trackball buttons
6	Air Vents
7	Probe Port: one active probe connector
8	Probe Locking Lever
9	**ON/OFF** Switch
10	Release Latches

3-4-1-2 Rear View of the Voluson i / Voluson e System

Figure 3-9 shows the view of the Voluson i / Voluson e ultrasound unit rear panel and external peripheral/accessory connectors:

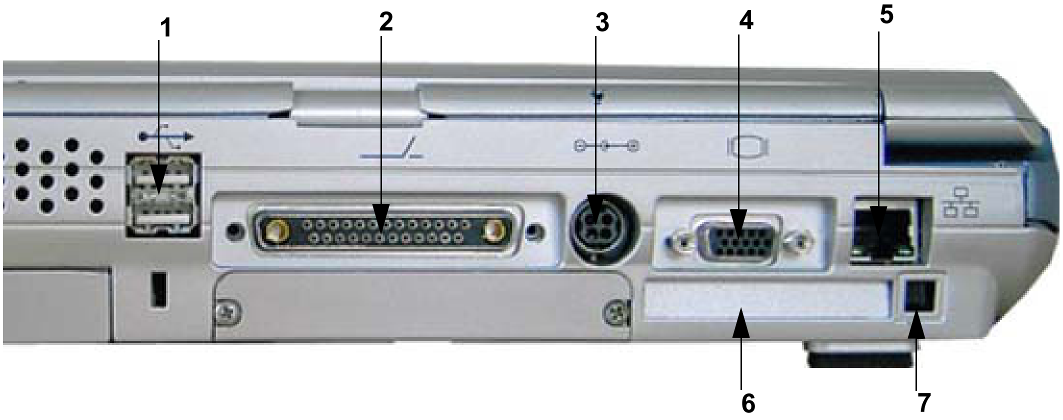


Figure 3-9 View of the Voluson i / Voluson e Rear Panel

1	Two interchangeable USB ports (Printers, DVD+R/RW Drive and other peripherals)
2	Docking connector (connector for Voluson Station Docking Adapter)
3	Port for DC IN (AC Adapter)
4	SVGA Output (VCR option or CRT monitor option)
5	LAN 10/100 Base-TX Ethernet network connector
6	PCMCIA port for PC card (Wireless LAN) (only available with GPC1-3)
7	Ejection lever for PCMCIA device

3-4-1-3 Front View of the Modo Cart

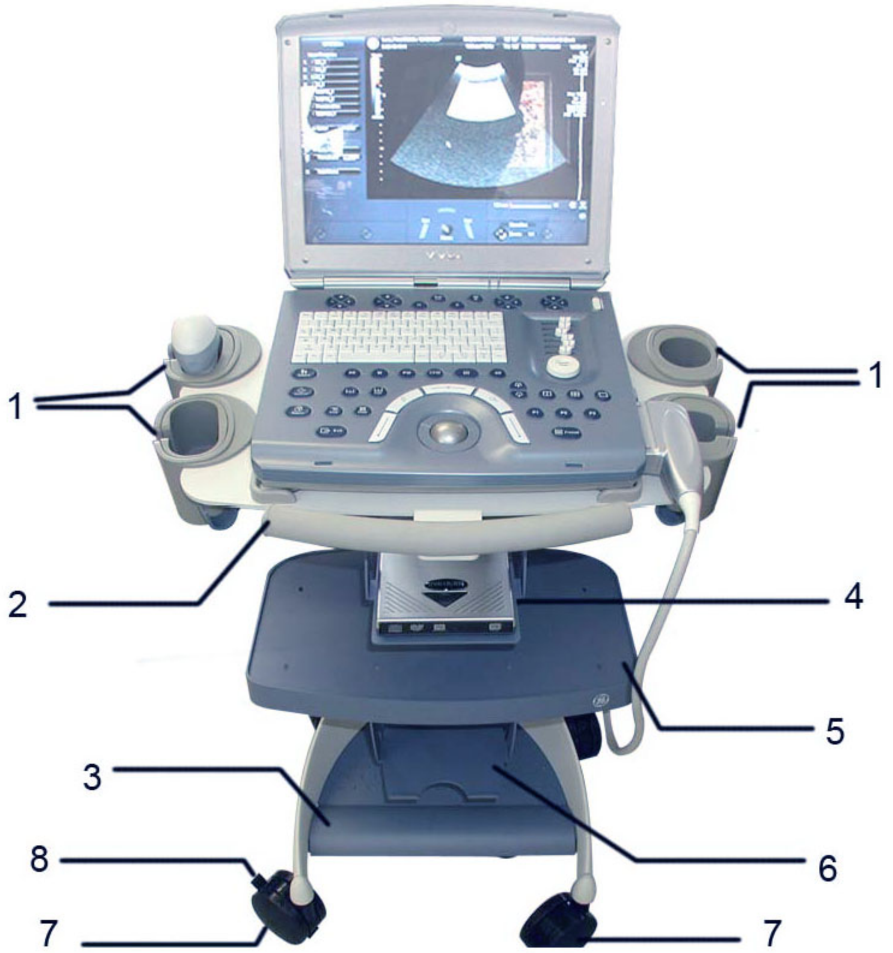


Figure 3-10 Modo Cart - Front View

1	Changeable probe/gel holders
2	Moving handle
3	Footrest
4	Upper peripheral storage shelf (e.g., for DVD+R/RW Drive)
5	Middle peripheral storage shelf (e.g., for Color printer, DVD recorder, ...)
6	Lower peripheral storage shelf (e.g., for B/W printer)
7	Front Caster wheels
8	Brakes

3-4-1-4 Rear View of the Modo Cart

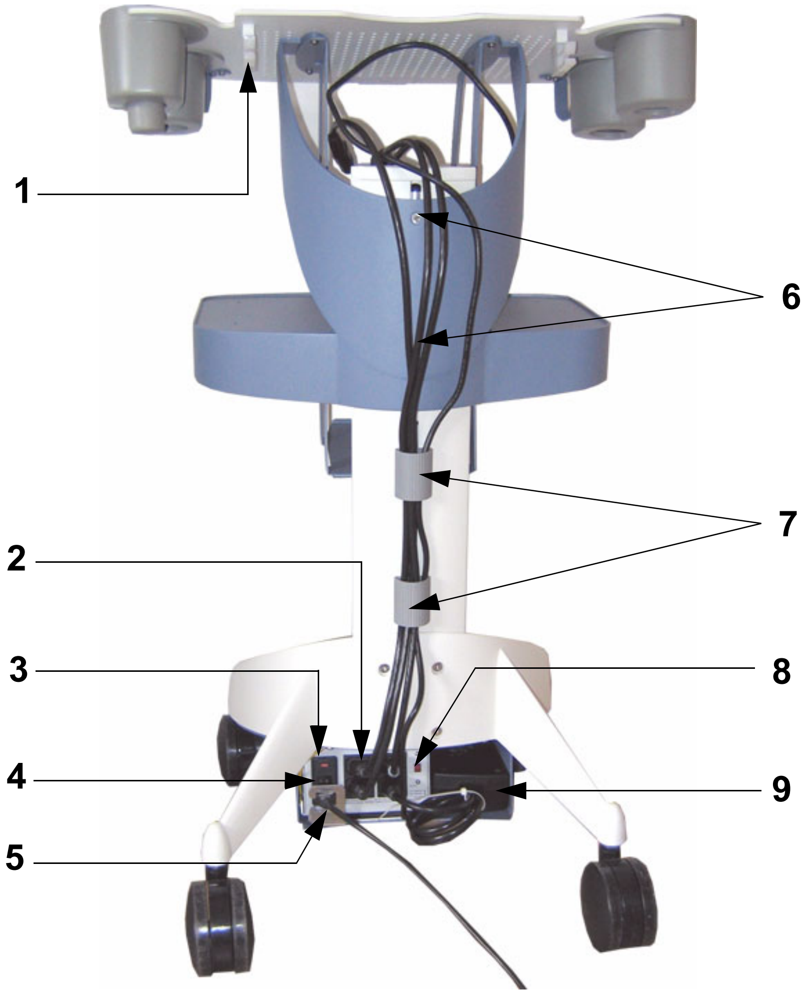


Figure 3-11 Modo Cart - Rear View

1	Cable hooks
2	Power outlets for Peripherals
3	Isolation Transformer Fuses for changing between 115V and 230V
4	Mains Power Switch
5	Power Cord + pull out protection mounted
6	Screws for changing the height of the mounting platform
7	Cable Management clips
8	Voltage Output Selector switch (115V and 230V)
9	Place for AC/DC Adapter of Voluson i / Voluson e

3-4-1-5 Front View of the Dock Cart / Dock Cart light

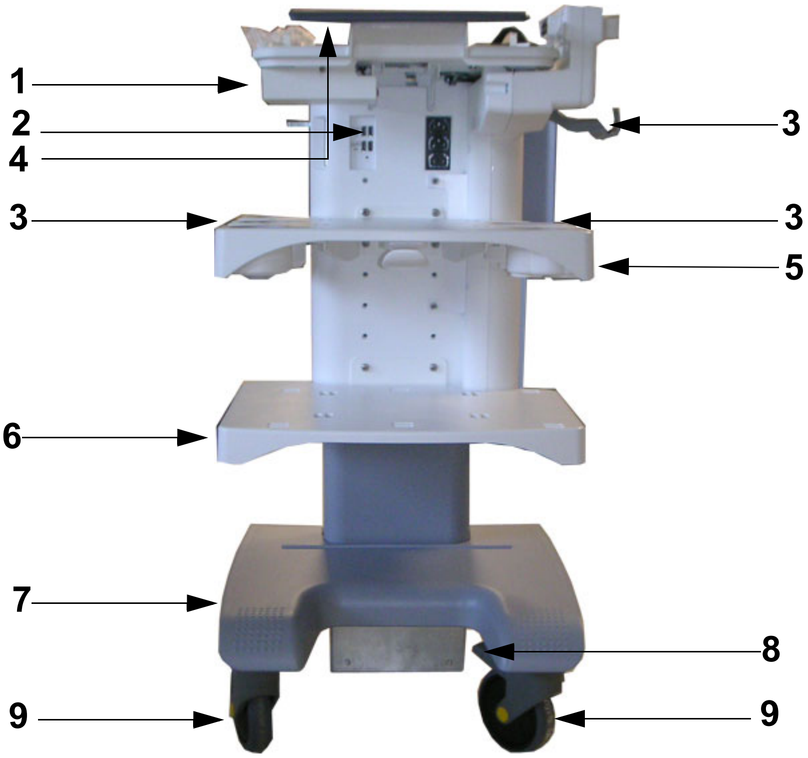


Figure 3-12 Dock Cart/Dock Cart light - Front View

1	Tray Recorder
2	USB Hub (not available on Dock Cart light)
3	Changeable probe/gel holders
4	Moving handle
5	Upper peripheral storage shelf (e.g., for Color printer)
6	Lower peripheral storage shelf (e.g., for B/W printer)
7	Footrest
8	Brakes
9	Front Caster Wheels

3-4-1-6 Rear View of the Dock Cart / Dock Cart light

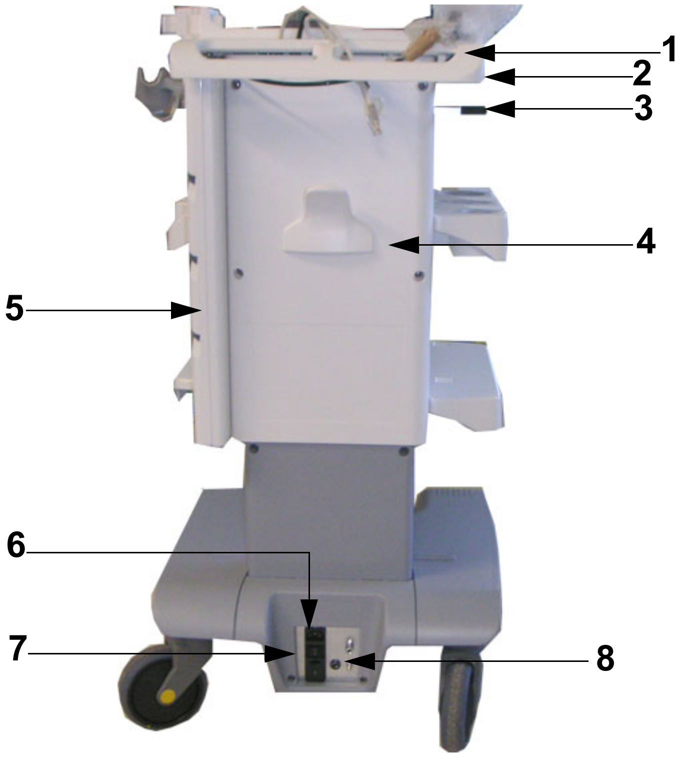


Figure 3-13 Dock Cart/Dock Cart light - Rear View

1	Lan Isolation Box (not available on Dock Cart light)
2	Moving Handles
3	Release Lever (not available on Dock Cart light)
4	Cable Guide
5	Probe Mux Box (not available on Dock Cart light)
6	Mains Power Switch
7	Power Supply Fuses for changing between 115V and 230V
8	Voltage Output Selector switch (115V and 230V)

3-4-1-7 Front View of the Voluson Station

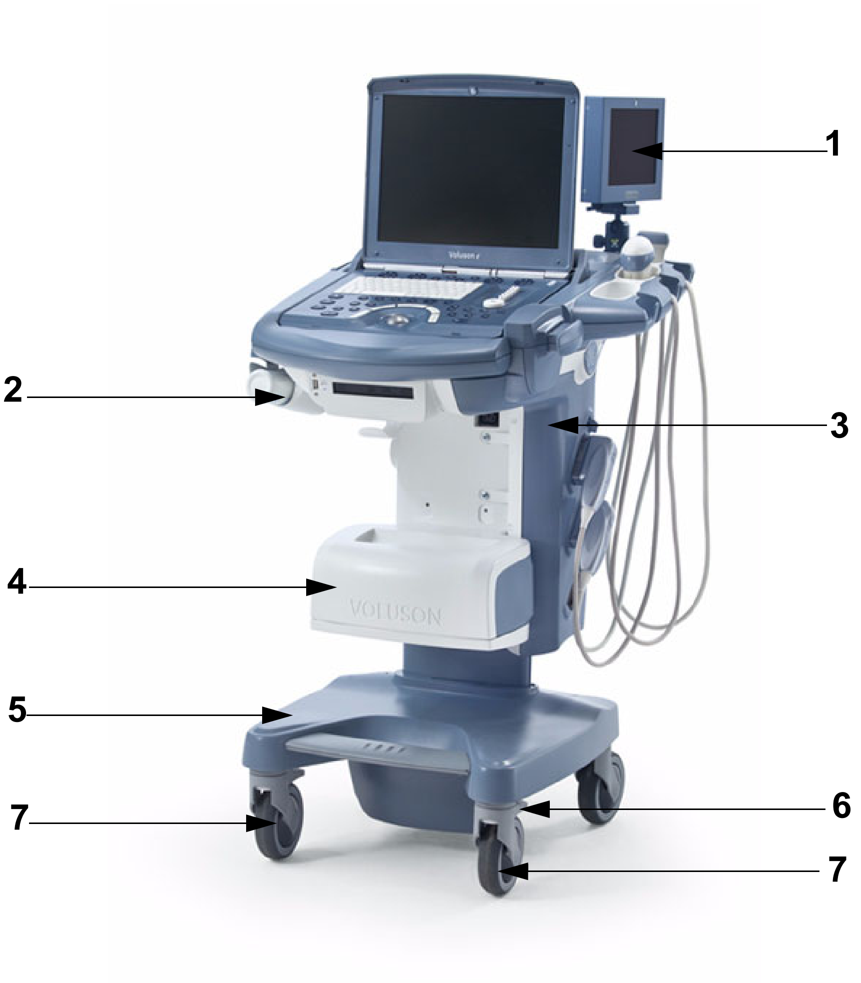


Figure 3-14 Voluson Station - Front View

1	Patient Monitor
2	Changeable probe/gel holders
3	optional Probe Mux Box
4	Cover BW Printer and Console Bottom Shelf
5	Footrest
6	Brakes
7	Front Caster Wheels

3-4-1-8 Rear View of the Voluson Station

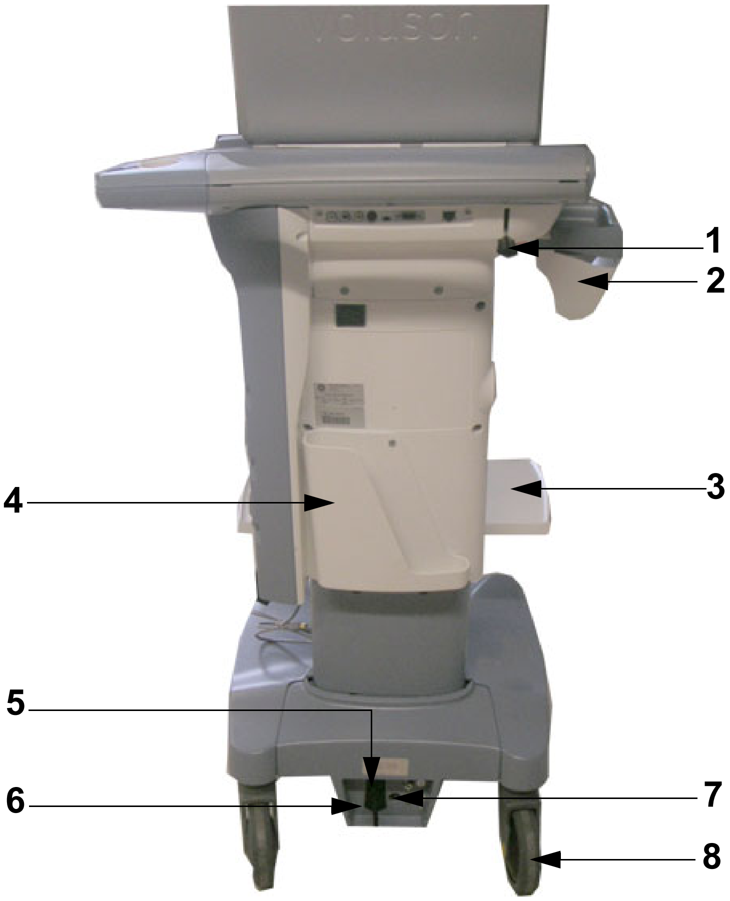


Figure 3-15 Voluson Station - Rear View

1	Release Lever
2	Changeable probe/gel holders
3	Additional Shelf Peripherals (e.g., for Color printer)
4	Storage Tray Back
5	Mains Power Switch
6	Power Supply Fuses for changing between 115V and 230V
7	Voltage Output Selector switch (115V and 230V)
8	Back Caster Wheels

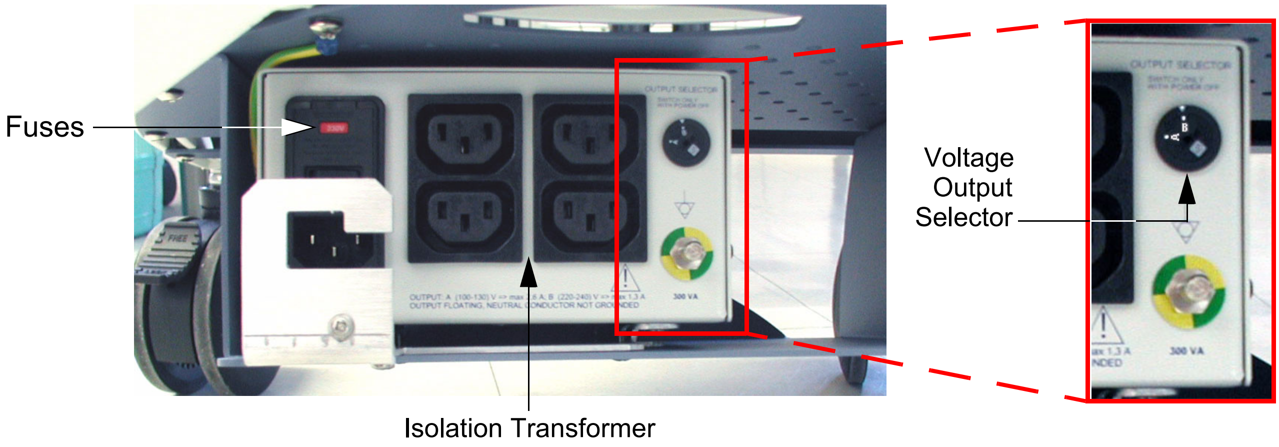
3-4-2 System Voltage Settings

NOTE: *Not necessary at the Voluson i / Voluson e portable ultrasound system:*
For details see: Table 2-3 "Electrical Specifications for Voluson i / Voluson e" on page 2-2.

3-4-3 Modo Cart Voltage Configuration

NOTE: *Only required when using the Voluson i / Voluson e with the optional Modo Cart.*

Check Fuses and Voltage Output Selector setting located on the isolation transformer of the Modo Cart.



CAUTION **Before starting the system or peripherals connected to the Modo Cart, always make sure:**
• Rating of isolation transformer fuses is compatible. • Output Selector is in correct position.
The wrong fuses and position of the voltage output selector may cause major damage on Voluson i / Voluson e and connected peripherals.

CAUTION **Rating of fuses depend on Voltage (refer to description on the isolation transformer box).**

If required switch Output Selector to correct position and exchange fuses of the isolation transformer.

a.) Open the fuse protection on the rear of the isolation transformer.

b.) Pull out the fuse holder and exchange the 2 fuses.

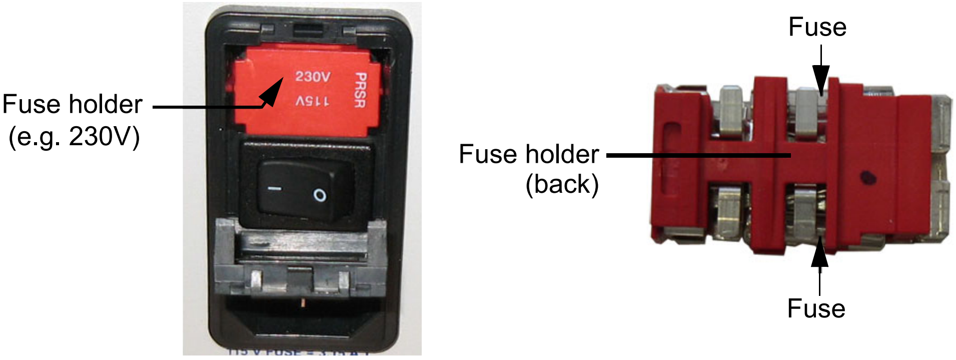


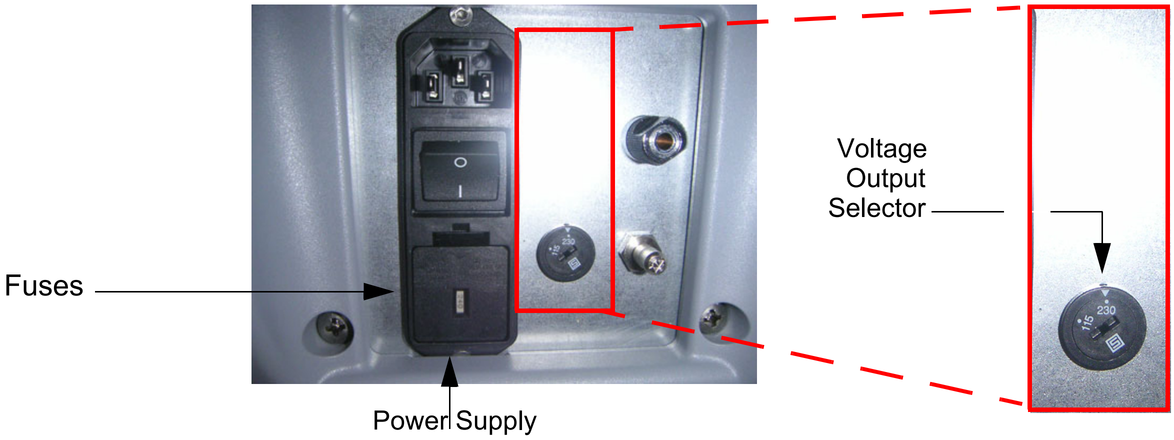
Figure 3-16 Change fuses of isolation transformer

c.) Push the fuse holder back into position (correct voltage should be shown in upper line, e.g, 230V, see: Figure 3-16, above) and then close protection.

3-4-4 Dock Cart / Dock Cart light / Voluson Station Voltage Configuration

NOTE: *Only required when using the Voluson i / Voluson e with the optional Dock Cart, Dock Cart light or Voluson Station.*

Check Fuses and Voltage Output Selector setting located on the power supply of the Cart.



CAUTION **Before starting the system or peripherals connected to the Cart, always make sure:**
• Rating of power supply fuses is compatible. • Output Selector is in correct position.
The wrong fuses and position of the voltage output selector may cause major damage on Voluson i / Voluson e and connected peripherals.

CAUTION **Rating of fuses depend on Voltage (refer to description on the power supply).**

If required switch Output Selector to correct position and exchange fuses of the power supply.

a.) Open the fuse protection on the rear of the power supply.

b.) Pull out the fuse holder and exchange the 2 fuses.

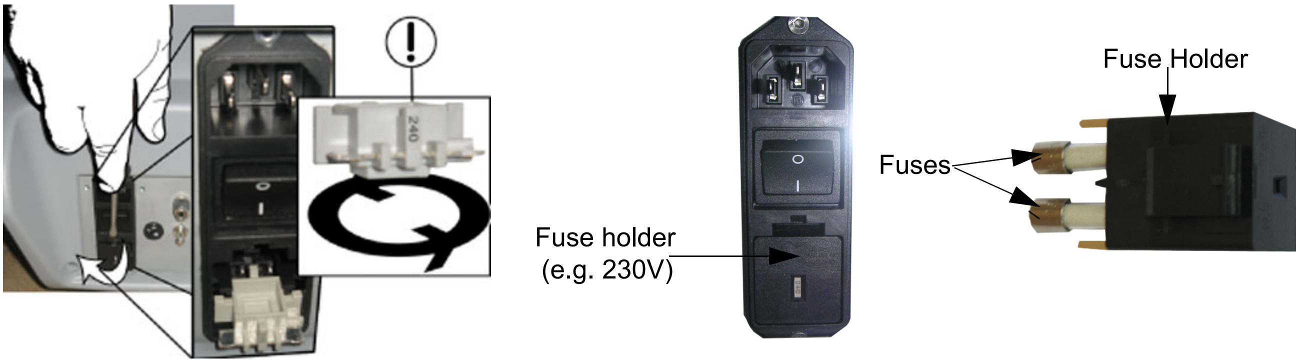


Figure 3-17 Change Main Power Voltage / Change fuses of power supply

c.) Push the fuse holder back into position (correct voltage should be shown in upper line, e.g, 230V) and then close protection.

3-4-5 EMI Protection

The Voluson i / Voluson e Ultrasound Unit has been designed to minimize the effects of Electo-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Ensure that the system is protected from electromagnetic interference (EMI), as follows:

- Operate system at least 15 feet away from equipment that emits strong electromagnetic radiation.
- Operate the system in an area enclosed by walls, floors and ceilings comprised of wood, plaster or concrete, which help prevent EMI.
- Shield the system when operating it in the vicinity of radio broadcast equipment, if necessary.
- Do not operate mobile phones or other EMI emitting devices in the ultrasound room.
- Verify that all EMI rules listed in the following table are followed:

The Voluson i / Voluson e ultrasound unit is approved for use in hospitals, clinics and other environmentally qualified facilities, in terms of the prevention of radio wave interference. Operation of the ultrasound unit in an inappropriate environment can cause electronic interference to radios and television sets situated near the medical equipment.
For further details and EMI Prevention/Abatement refer to Section 2-2-3 "EMI Limitations" on page 2-3.

Section 3-5
Connection of Auxiliary Devices

Table 3-9 below outlines the Voluson i/e hardware installation procedures described in the sub-sections.

Table 3-9 Connection Procedures

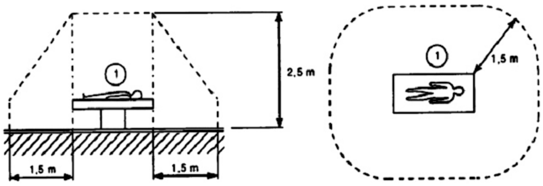
Sub-section	Description	Page Number
3-5-1	Connection and Usage of the optional Modo Cart	3-25
	Attaching the Voluson i / Voluson e to the Modo Cart	3-25
	Mounting small Peripherals (e.g., Black & White Printer)	3-27
	Mounting large Peripherals (e.g., Color Printer)	3-28
3-5-2	Connection and Usage of the optional Dock Cart	3-29
	Attaching the Voluson i / Voluson e to the Dock Cart	3-29
	Installation of the Probe Mux Box	3-31
	Installation of the Probe Shelf	3-32
	Installation of the Top Probe Holder	3-32
	Mounting small Peripherals (e.g., Black & White Printer)	3-33
	Mounting large Peripherals (e.g., Color Printer)	3-34
3-5-3	Connection and Usage of the optional Voluson Station	3-35
	Attaching the Voluson i / Voluson e to the Voluson Station	3-35
	Installation Gel Condom Holder / Probe Holder for Endocavity Probe	3-37
	Installation of the Additional Shelf Peripherals	3-38
	Installation of the Console Bottom Shelf	3-38
	Installation of the Cover BW Printer Shelf	3-38
	Installation of the Patient Monitor	3-39
	Installation of the Probe Mux Box Voluson Station	3-40
	Mounting small Peripherals (e.g., Black & White Printer)	3-41
	Mounting large Peripherals (e.g., VCR)	3-42
3-5-4	Connecting the Wireless Network Adapter/Interface	3-43
3-5-5	General Remarks and Hints when using external USB-Devices	3-44
3-5-6	Connecting the USB Hub	3-45
3-5-7	Connecting the DVD+R/RW Drive	3-46
3-5-8	Connecting the USB Flash Memory Stick	3-49
3-5-9	Connecting the external USB Hard disk (Handydrive)	3-50
3-5-10	Connecting the Black & White Printer	3-51
3-5-11	Connecting the Color Printer	3-52
3-5-12	Connecting the DeskJet Color Printer	3-53
3-5-13	Connecting the VCR (VideoCassette Recorder)	3-55
3-5-14	Connecting the DVD Recorder	3-60

CAUTION **Power Supplies for additional equipment MUST comply with IEC 60601-1. Auxiliary equipment with direct main connection requires galvanic separation of the signal and/or control leads.**

WARNING ***DO NOT attempt to use different peripherals and accessories other than approved and provided by GE!***
Any unauthorized peripherals may cause system failure or damage!

WARNING ***After each installation, the leakage currents have to be measured according to IEC 60601-1 respectively UL 60601-1 (see: Section 10-7-2 on page 10-13).***

CAUTION **Please observe that some printers may not be medical devices! If they are not medical devices, they have to be located outside of the patient environment (acc. to IEC 60601-1 / UL 60601-1).**



NOTE: For more detailed Safety Considerations when connecting auxiliary devices to the Voluson i / Voluson e system, please review: Chapter 1 - Auxiliary Devices Safety on page 1-10.

3-5-1 Connection and Usage of the optional Modo Cart

WARNING ***DO NOT CONNECT any devices to any AC power other than the on-board outlets from the transformer, as this might increase leakage currents and sacrifice patient safety.***

WARNING ***Before starting the Voluson i / Voluson e or Peripherals that are connected to the Modo Cart, ALWAYS make sure that rating of the isolation transformer fuses is compatible and the voltage output selector is in the correct position.***
The wrong fuses and position of the voltage output selector may cause major damage on the Voluson i / Voluson e system and connected peripherals.

CAUTION **Make sure that all peripherals are firmly secured in position using Velcro tapes or straps. Place heavy and large devices on the middle storage shelf.**

3-5-1-1 Attaching the Voluson i / Voluson e to the Modo Cart

NOTICE A battery or an empty battery shell should always be attached to the Voluson i / Voluson e system before attaching it to the Modo Cart.

1.) Hold the Voluson i / Voluson e slightly tilted towards you and place it over the front sliding guides.

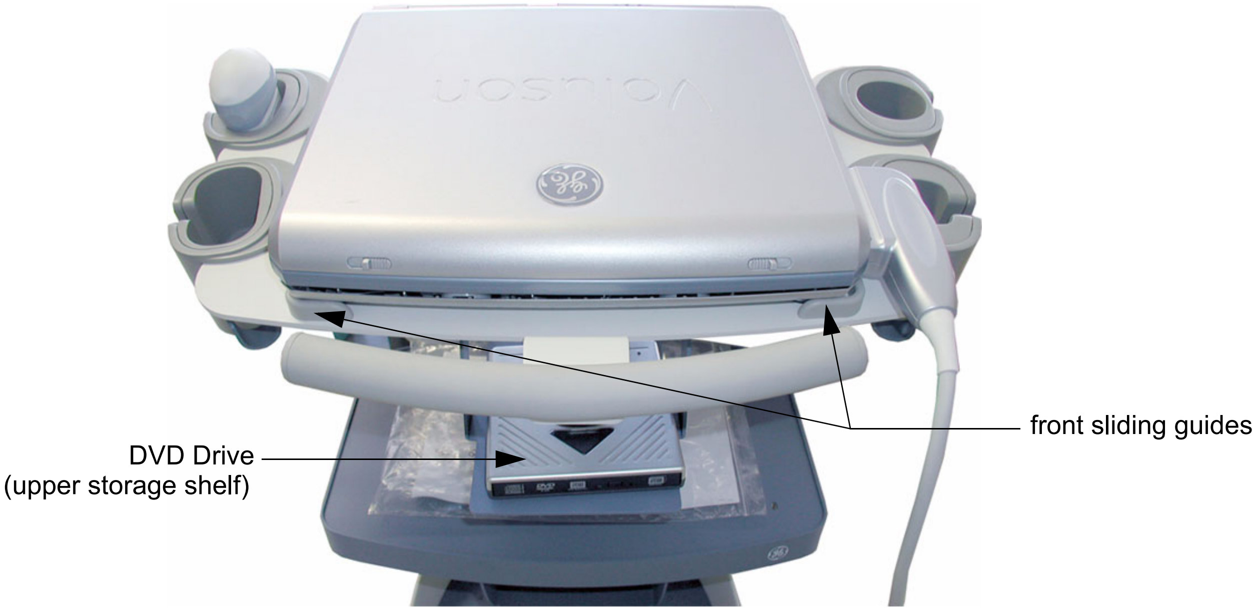


Figure 3-18 Voluson i / Voluson e attached to the Modo Cart

CAUTION **It is not possible to fix the Voluson i / Voluson e on the mounting plate of the Modo Cart!**

2.) Take a power extender cable and plug it into the AC main adapter of the Voluson i / Voluson e.

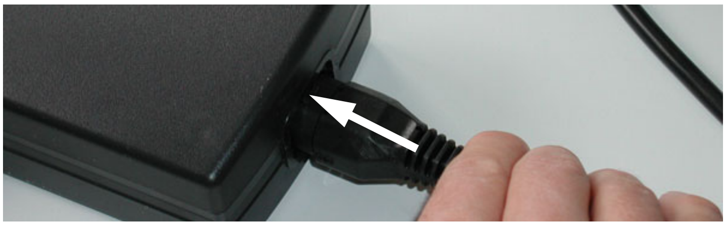


Figure 3-19 AC (main) Adapter connection

3-5-1-1 Attaching the Voluson i / Voluson e to the Modo Cart (cont'd)

3.) Connect the L-shaped circular power cable plug of the AC Adapter to the power inlet plug DC IN on the rear of the Voluson i / Voluson e unit (see: Figure 3-20 below).

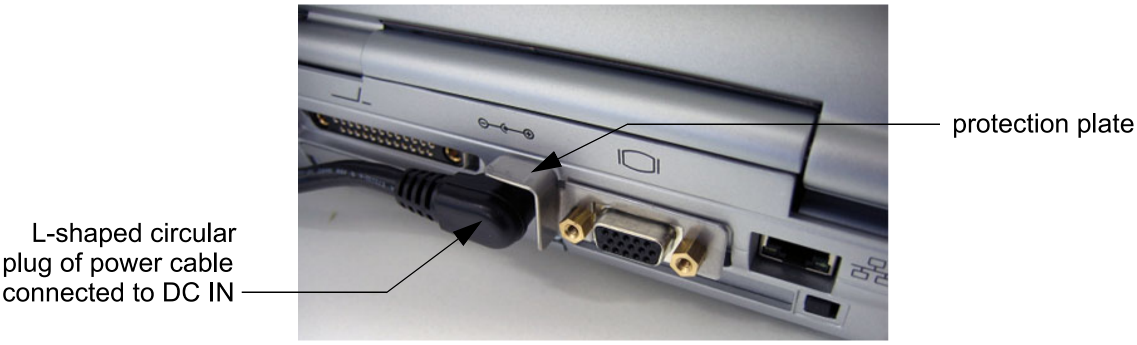

protection plate
L-shaped circular plug of power cable connected to DC IN

Figure 3-20 main power cable connected to Voluson i / Voluson e´s power inlet (DC IN) connector

4.) Plug the other end of the power extender cable to an outlet of the transformer on the Modo Cart.

5.) Put the AC adapter beside the transformer into the shelf and fasten it (see: Figure 3-21 below).

6.) Place the DVD Drive on the upper peripheral shelf of the Modo Cart and fasten it.

7.) Take a power extender cable and plug it into the adapter of the DVD Drive; the other end connect to an on-board outlet of the isolation transformer on the Modo Cart.

8.) Plug the power cable and the USB-cable into the DVD-drive; the other end of the USB cable plug to an USB port on the rear of the Voluson i / Voluson e.

9.) Mount and connect other peripherals as described in Section 3-5-1-2 and Section 3-5-1-3.

10.) Connect the main power cable to the isolation transformer of the Modo Cart; the other end connect to a hospital-grade main power outlet with the proper rated voltage.

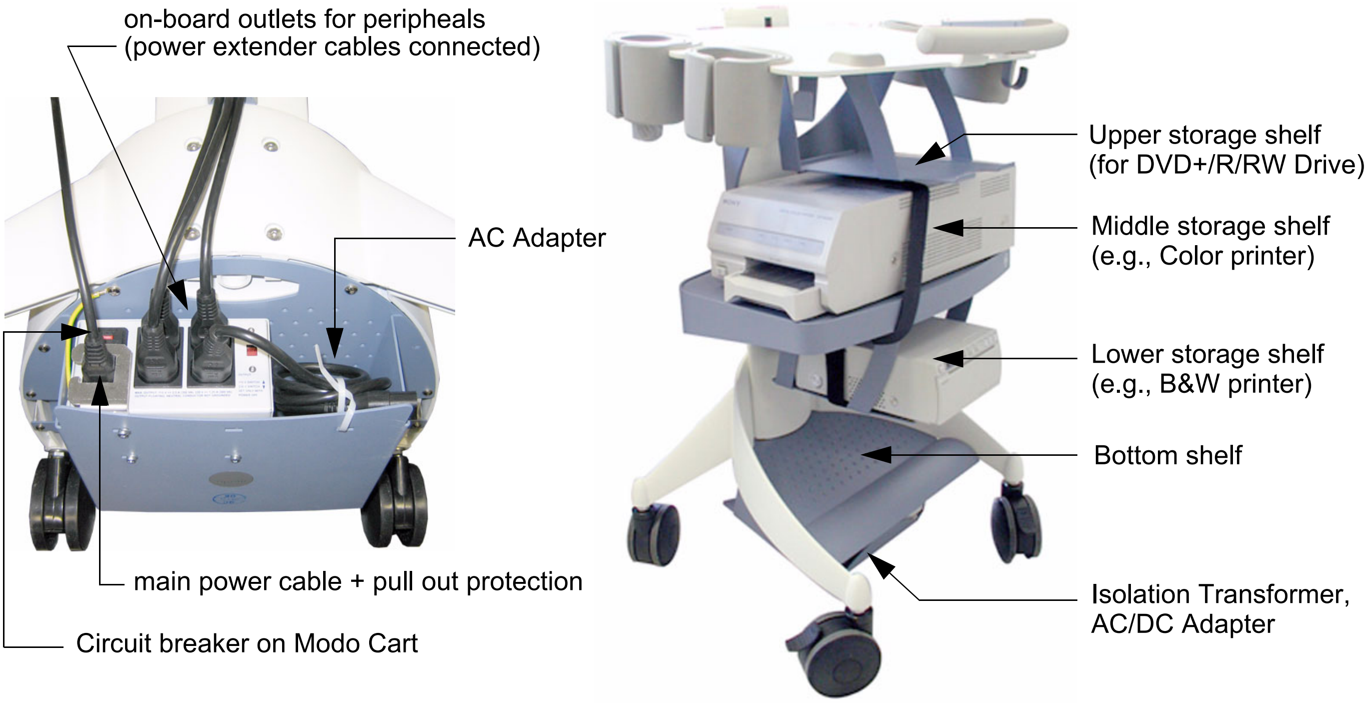

on-board outlets for peripheals (power extender cables connected)
AC Adapter
main power cable + pull out protection
Circuit breaker on Modo Cart
Upper storage shelf (for DVD+/R/RW Drive)
Middle storage shelf (e.g., Color printer)
Lower storage shelf (e.g., B&W printer)
Bottom shelf
Isolation Transformer, AC/DC Adapter

Figure 3-21 Isolation Transformer of Modo Cart / Peripherals mounted and secured

11.) Press the Circuit breaker on the Modo Cart. To start up the system, press the **On/Off** button (see: Figure 3-87) on the control panel of the Voluson i / Voluson e system (for ~3 seconds).

3-5-1-2 Mounting small Peripherals (e.g., Black & White Printer)

1.) Place the B&W Printer on the lower peripheral shelf of the Modo Cart.
2.) Take a Velcro tape and pull it under the shelf (left image at Figure 3-22 below).

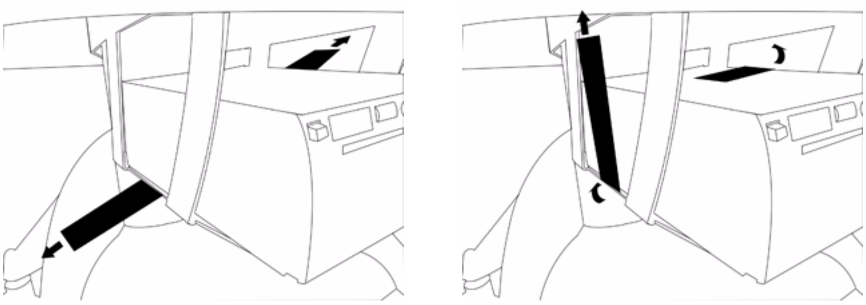


Figure 3-22 pull Velcro tape under shelf and printer

3.) Pull up the Velcro tape on the left side. The other end of the tape place on the printer (right image at Figure 3-22, above).
4.) Place the end of the Velcro tape on the top of the other end (left image at Figure 3-23 below).

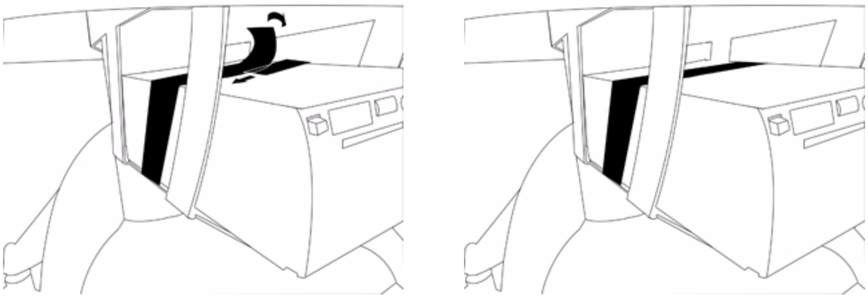


Figure 3-23 fasten Velcro tape

NOTE: *Make sure that the Velcro tape is firmly fastened. For reference see: Figure 3-21 on page 3-26.*

5.) Connect the peripheral device and mount the pull out protection of the power cable.
Links to connection schemes can be found in Table 3-9, "Connection Procedures," on page 3-23.

NOTE: *A power extender cable from the power outlets of the Modo Carts isolation transformer should be used to connect peripheral devices. Please* ***connect the power extender cable to the peripherals first,*** *then connect the other end to the isolation transformer of the Modo Cart.*
(Cables can be routed inside the cable management clips, see: Figure 3-11 on page 3-15.)

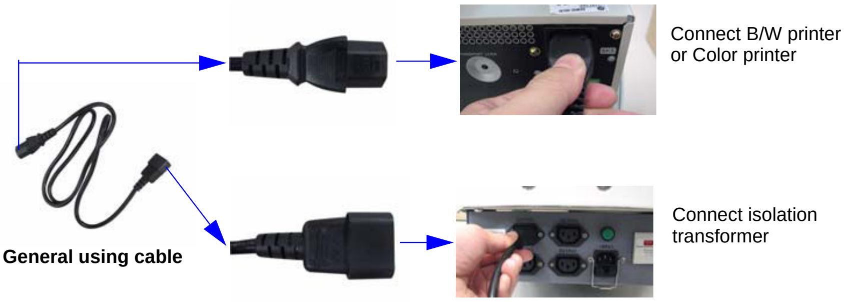


Figure 3-24 Connect peripheral device to the Modo Cart (isolation transformer)

3-5-1-3 Mounting large Peripherals (e.g., Color Printer)

1.) Place the Color Printer, VCR or DVD recorder on the middle peripheral shelf of the Modo Cart.

2.) Take a Velcro tape and pull it under the shelf (left image at Figure 3-25 below).

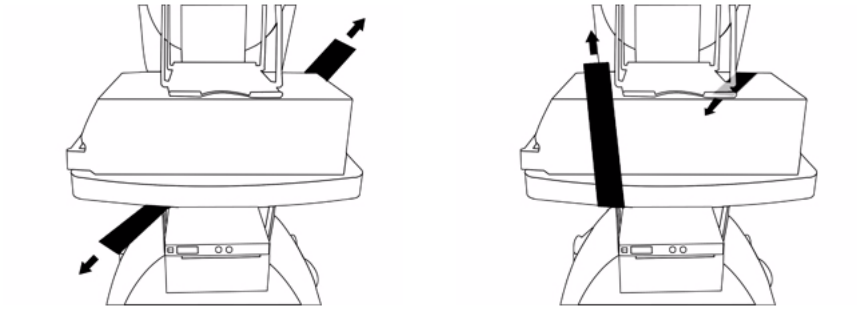


Figure 3-25 pull Velcro tape under shelf and printer

3.) Pull up the Velcro tape on the front side. The other end of the tape place on the printer (right image at Figure 3-25, above).

4.) Place the end of the Velcro tape on the top of the other end (left image at Figure 3-26 below).

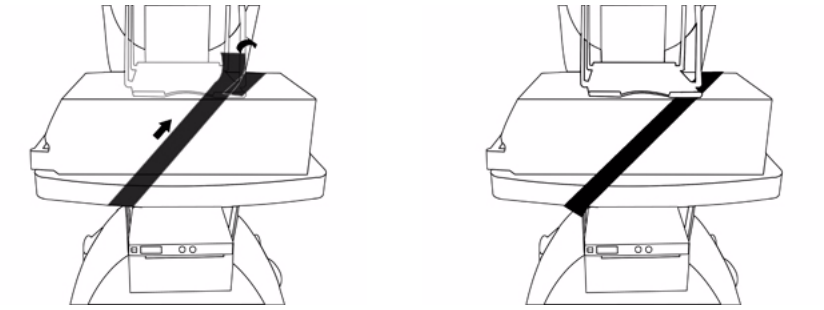


Figure 3-26 fasten Velcro tape

NOTE: Make sure that the Velcro tape is firmly fastened. For reference see: Figure 3-21 on page 3-26.

5.) Connect the peripheral device and mount the pull out protection of the power cable.
Links to connection schemes can be found in Table 3-9, “Connection Procedures,” on page 3-23.

*NOTE: A power extender cable from the power outlets of the Modo Carts isolation transformer should be used to connect peripheral devices. Please **connect the power extender cable to the peripherals first,** then connect the other end to the isolation transformer of the Modo Cart.*
(Cables can be routed inside the cable management clips, see: Figure 3-11 on page 3-15.)

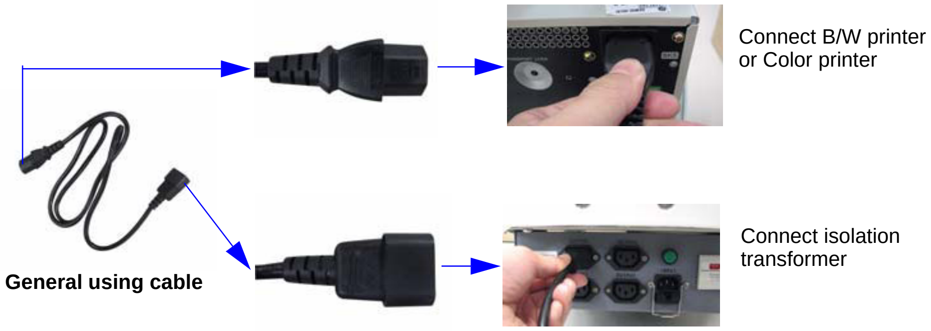


Figure 3-27 Connect peripheral device to the Modo Cart (isolation transformer)

3-5-2 Connection and Usage of the optional Dock Cart

WARNING ***DO NOT CONNECT any devices to any AC power other than the on-board outlets from the transformer, as this might increase leakage currents and sacrifice patient safety.***

WARNING ***Before starting the Voluson i / Voluson e or Peripherals that are connected to the Dock Cart, ALWAYS make sure that rating of the power supply fuses is compatible and the voltage output selector is in the correct position.***
The wrong fuses and position of the voltage output selector may cause major damage on the Voluson i / Voluson e system and connected peripherals.

CAUTION **Make sure that all peripherals are firmly secured in position using Velcro tapes or straps. Place heavy and large devices on the lower storage shelf.**

3-5-2-1 Attaching the Voluson i / Voluson e to the Dock Cart

NOTICE A battery or an empty battery shell should always be attached to the Voluson i / Voluson e system before attaching it to the Dock Cart.

1.) Hold the Voluson i / Voluson e slightly tilted towards you and place it on the top shelf next to the arm rest.

2.) Now push the Voluson i / Voluson e away from the armrest until it locks in place.

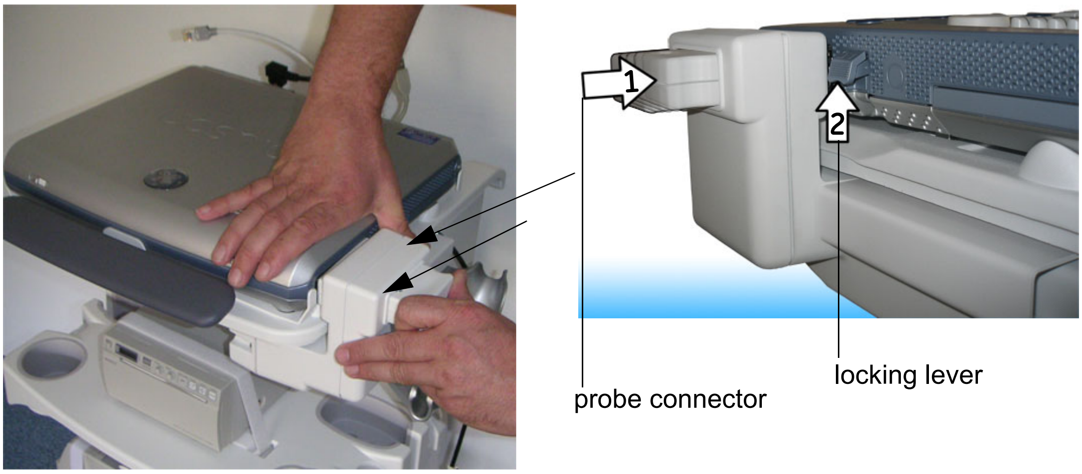


Figure 3-28 Voluson i / Voluson e attached to the Dock Cart

3.) Push the probe connector into the probe socket of the Voluson i / Voluson e and lift the locking lever upwards to lock the probe connector.The Probe Box enables the connection of up to 3 probes to the Voluson i / Voluson e.

4.) Connect the cables to the rear of the Voluson i / Voluson e. The cables to connect are listed below. The order of connection is not important:

- L-Shaped circular plug of the power cable
- USB Cable - Connect the USB plug to the lower USB connector on the rear-panel of the Voluson i / Voluson e. To connect USB Devices to the system, plug them into the Dock Cart’s USB ports.
- LAN cable - Connect the ethernet cable, routing from the LAN isolation box, into the network port of the Voluson i / Voluson e.

5.) Place the DVD Drive on the Tray recorder (see Figure 3-10 on page 3-14) and connect it.

3-5-2-1 Attaching the Voluson i / Voluson e to the Dock Cart (cont'd)

6.) Plug the power cable and the USB-cable into the DVD-drive; the other end of the USB cable plug to an USB port on the Voluson i / Voluson e.

7.) Mount and connect other peripherals as described in Section 3-5-2-5 and Section 3-5-2-6.

8.) Connect the main power cable to the Power Supply of the Dock Cart; the other end connect to a hospital-grade main power outlet with the proper rated voltage.

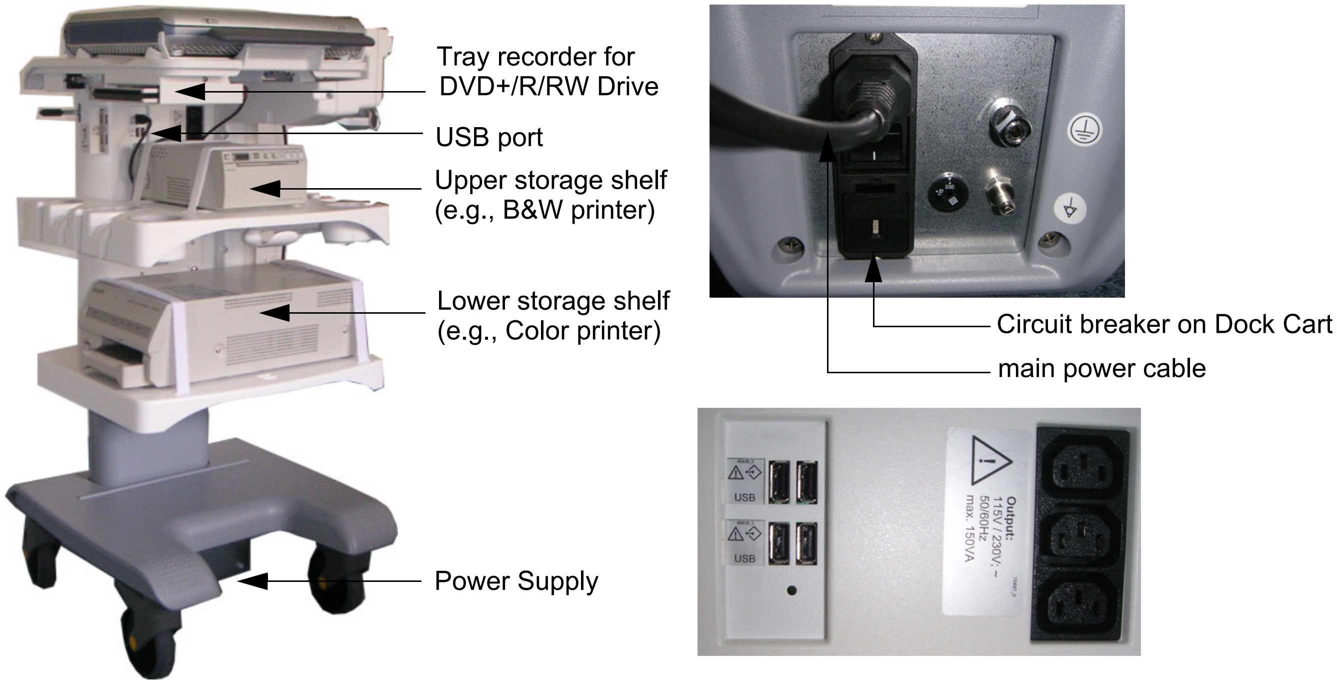

Tray recorder for DVD+/R/RW Drive
USB port
Upper storage shelf (e.g., B&W printer)
Lower storage shelf (e.g., Color printer)
Power Supply
Circuit breaker on Dock Cart
main power cable
USB
USB
Output:
115V / 230V; ~
50/60Hz
max. 150VA

Figure 3-29 Peripherals mounted and secured / Power Supply of Dock Cart / USB-port on Dock Cart

9.) Press the Circuit breaker on the Dock Cart. To start up the system, press the **On/Off** button (see: Figure 3-87) on the control panel of the Voluson i / Voluson e system (for ~3 seconds).

3-5-2-2 Installation of the Probe Mux Box

1.) Remove the Probe Holder or the Top Probe Holder.

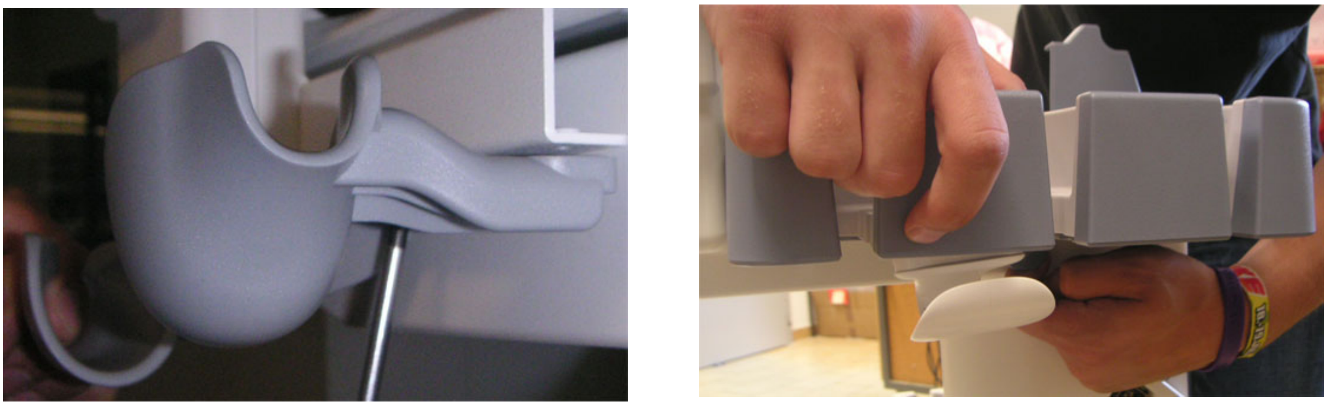


Figure 3-30 Remove the Probe Holder / Top Probe Holder

2.) Loosen (don't remove) the 2 screws (bottom right side of the top shelf) that hold the RIC Probe Holder and slide the holder as far out as you can to the right. Re-tighten screws.

3.) Fasten the Box on the Dock Cart with the 3 screws.

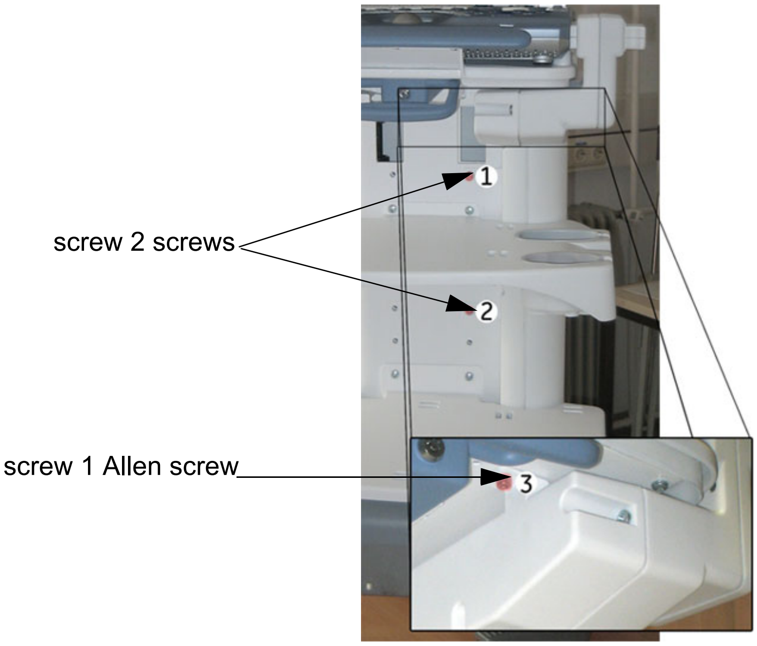


Figure 3-31 Fasten the Probe Mux Box

4.) Push the probe connector into the probe socket of the Voluson i / Voluson e and lift the locking lever upwards to lock the probe connector.

5.) Remount the RIC Probe Holder or the Top Probe Holder.

3-5-2-3 Installation of the Probe Shelf

1.) Place the Probe shelf and fasten it with the 4 Allen screws.

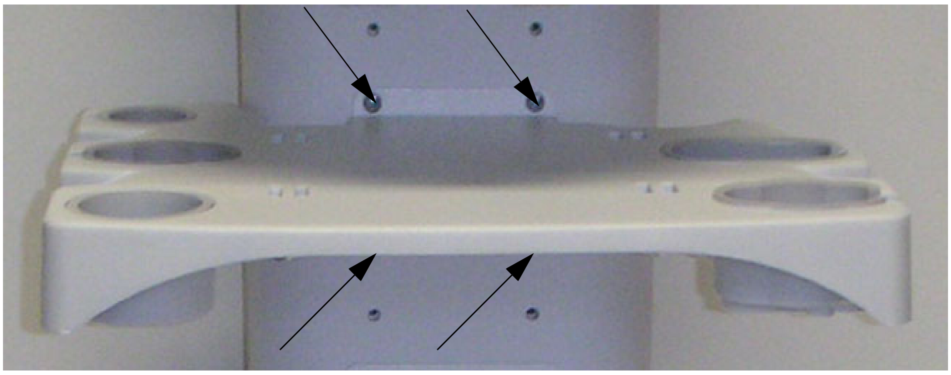


Figure 3-32 Fasten the Probe shelf

3-5-2-4 Installation of the Top Probe Holder

1.) Put the Top Probe Holder into the Top Probe Holder Adaptation.

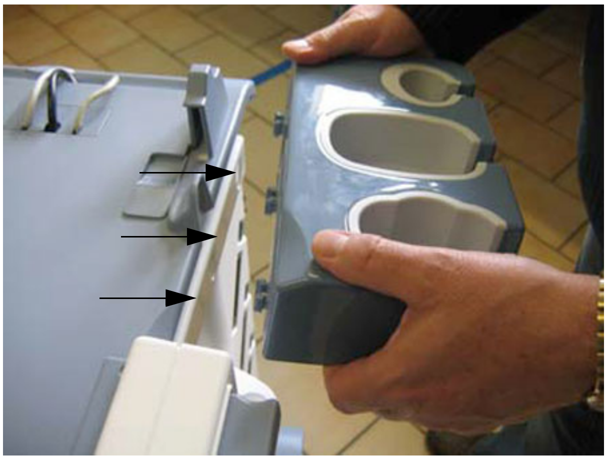


Figure 3-33 Installation Top Probe Holder

3-5-2-5 Mounting small Peripherals (e.g., Black & White Printer)

1.) Place the B&W Printer on the upper peripheral shelf of the Dock Cart.

2.) Take a Velcro tape and pull it under the shelf.

3.) Pull up the Velcro tape on the left side. The other end of the tape place on the printer.

4.) Place the end of the Velcro tape on the top of the other end.

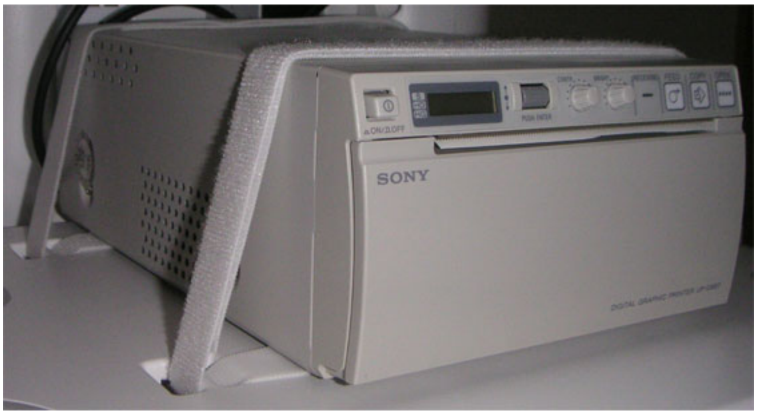


Figure 3-34 pull Velcro tape under shelf and printer and fasten it

NOTE: Make sure that the Velcro tape is firmly fastened. For reference see: Figure 3-29 on page 3-30.

5.) Connect the peripheral device and mount the pull out protection of the power cable.
Links to connection schemes can be found in Table 3-9, “Connection Procedures,” on page 3-23.

*NOTE: A power extender cable only from the on-board power sockets of the Dock Carts transformer should be used to connect peripheral devices. Please **connect the power extender cable to the peripherals first,** then connect the other end to the Power Distribution of the Dock Cart.*

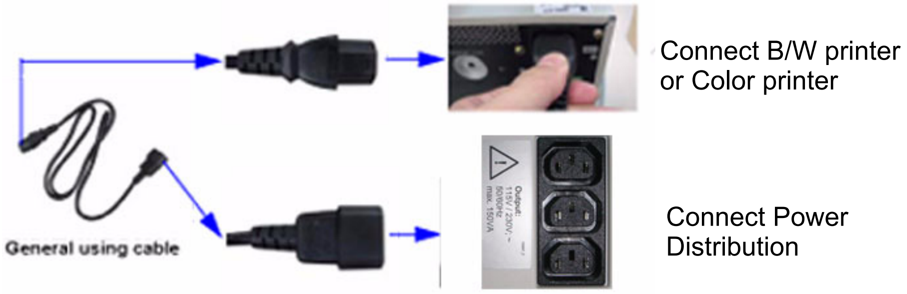

General using cable
Connect B/W printer or Color printer
Output: 115V / 230V ~ 50/60Hz max. 150VA
Connect Power Distribution

Figure 3-35 Connect peripheral device to the Dock Cart

3-5-2-6 Mounting large Peripherals (e.g., Color Printer)

1.) Place the Color Printer or VCR recorder on the lower peripheral shelf of the Dock Cart.
2.) Take a Velcro tape and pull it under the shelf.
3.) Pull up the Velcro tape on the left side. The other end of the tape place on the printer.
4.) Place the end of the Velcro tape on the top of the other end.

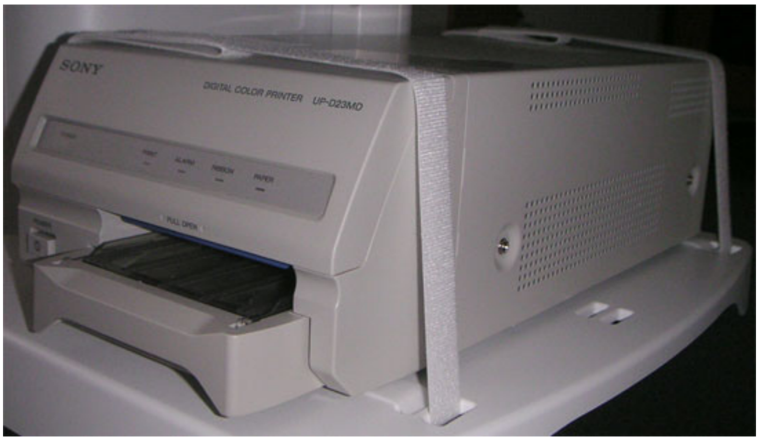


Figure 3-36 pull Velcro tape under shelf and printer and fasten it

NOTE: Make sure that the Velcro tape is firmly fastened. For reference see: Figure 3-29 on page 3-30.

5.) Connect he peripheral device and mount the pull out protection of the power cable.
Links to connection schemes can be found in Table 3-9, “Connection Procedures,” on page 3-23.

*NOTE: A power extender cable only from the on-board power sockets of the Dock Carts transformer should be used to connect peripheral devices. Please **connect the power extender cable to the peripherals first,** then connect the other end to the Power Distribution of the Dock Cart.*

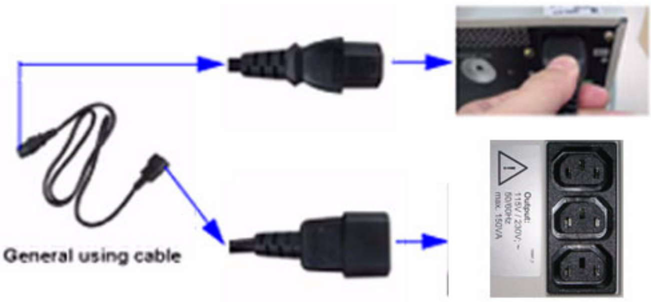


Figure 3-37 Connect peripheral device to the Dock Cart

3-5-3 Connection and Usage of the optional Voluson Station

WARNING ***DO NOT CONNECT any devices to any AC power other than the on-board outlets from the transformer, as this might increase leakage currents and sacrifice patient safety.***

WARNING ***Before starting the Voluson i / Voluson e or Peripherals that are connected to the Voluson Station, ALWAYS make sure that rating of the power supply fuses is compatible and the voltage output selector is in the correct position.***
The wrong fuses and position of the voltage output selector may cause major damage on the Voluson i / Voluson e system and connected peripherals.

CAUTION **Make sure that all peripherals are firmly secured in position according installation procedure.**

3-5-3-1 Attaching the Voluson i / Voluson e to the Voluson Station

NOTICE A battery or an empty battery shell should always be attached to the Voluson i / Voluson e system before attaching it to the Voluson Station.

1.) Place the system in the docking bay on the top shelf of the Voluson Station (1).

2.) Pull down the docking lever(2+3).

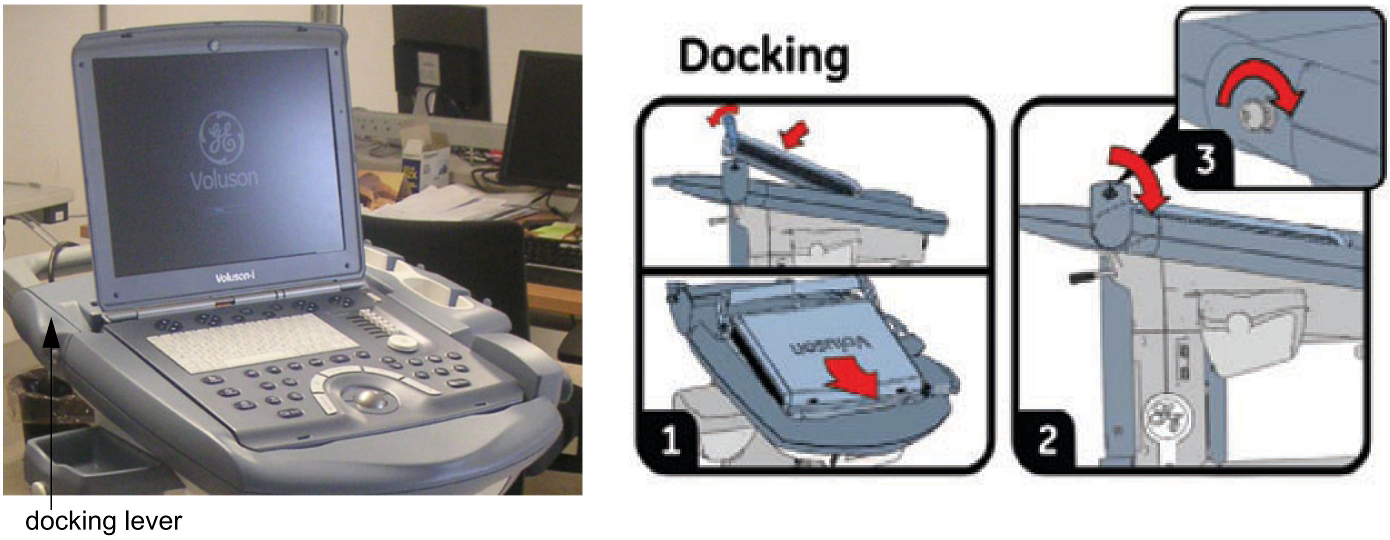


Figure 3-38 Voluson i / Voluson e attached to the Voluson Station

3-5-3-1 Attaching the Voluson i / Voluson e to the Voluson Station (cont'd)

If applicable, connect the Probe Mux Box.

3.) Push the probe connector into the probe socket of the Voluson i / Voluson e.
4.) Lift the system's locking lever upwards to lock the probe connector.

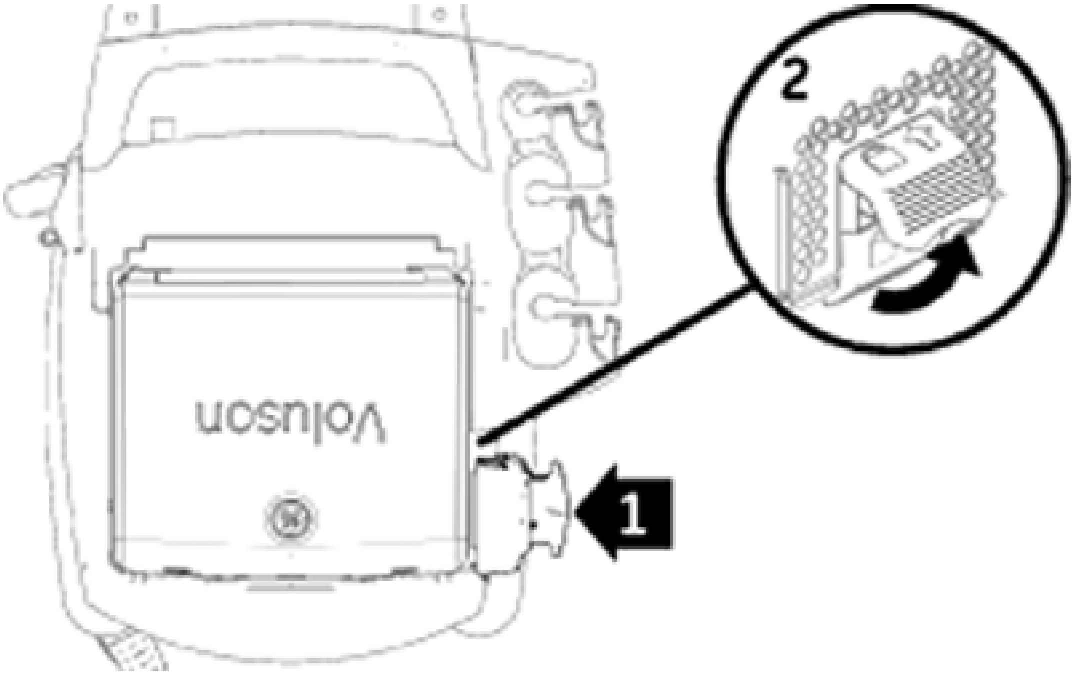


Figure 3-39 Voluson i / Voluson e attached to the Voluson Station

The Probe Mux Box enables the connection of up to 3 probes to the Voluson i / Voluson e.

5.) Connect the cable to the rear of the Voluson i / Voluson e. The cable is listed below:
- LAN cable - Connect the ethernet cable, routing from the LAN isolation box, into the network port of the Voluson i / Voluson e.

6.) Mount and connect other peripherals as described in Section 3-5-3-8 and Section 3-5-3-9.
7.) Connect the main power cable to the Power Supply of the Voluson Station; the other end connect to a hospital-grade main power outlet with the proper rated voltage.

3-5-3-1 Attaching the Voluson i / Voluson e to the Voluson Station (cont'd)

8.) Press the Circuit breaker on the Voluson Station. To start up the system, press the **On/Off** button (see: Figure 3-87) on the control panel of the Voluson i / Voluson e system (for ~3 seconds).

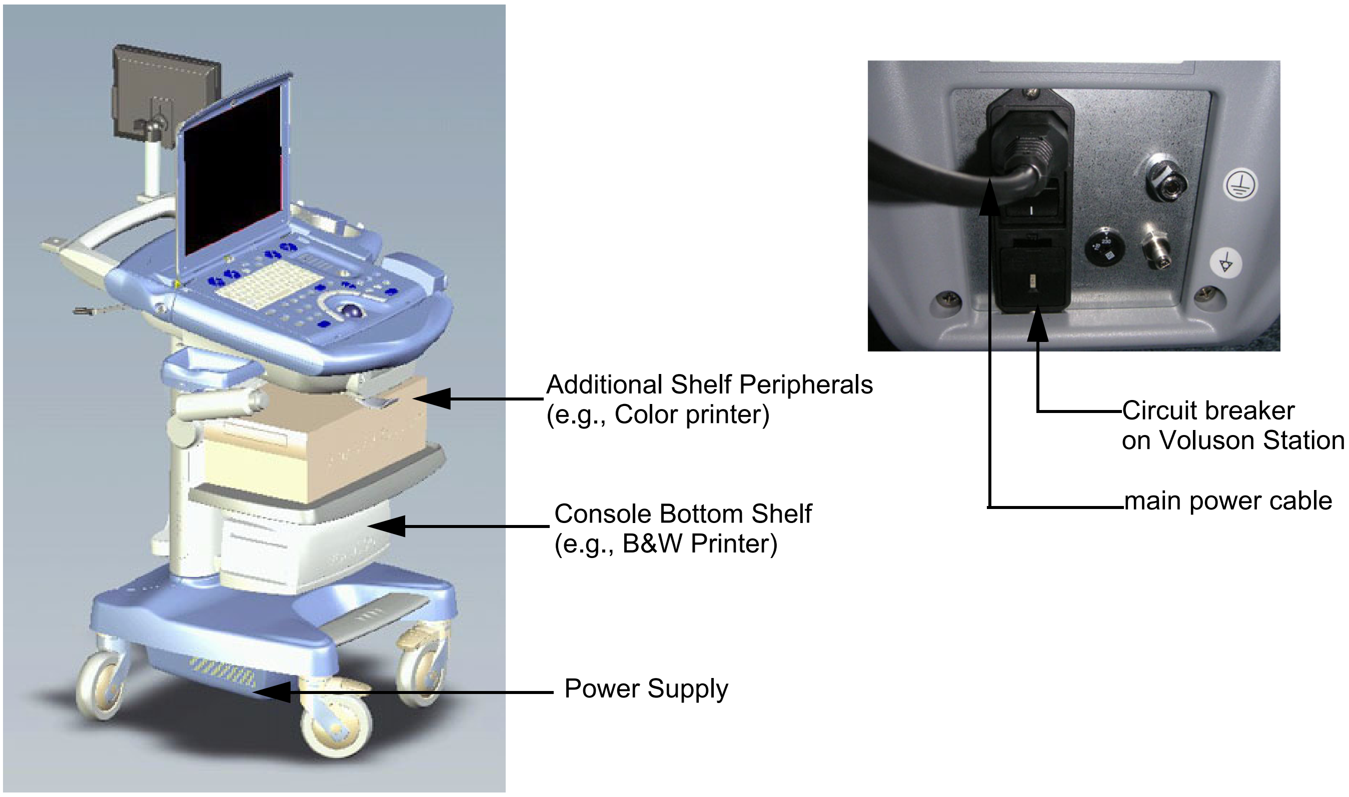

Additional Shelf Peripherals
(e.g., Color printer)
Console Bottom Shelf
(e.g., B&W Printer)
Power Supply
Circuit breaker
on Voluson Station
main power cable

Figure 3-40 Peripherals mounted and secured / Power Supply of Voluson Station

3-5-3-2 Installation Gel Condom Holder / Probe Holder for Endocavity Probe

1.) Put the Gel Condom Holder or the Probe Holder for Endocavity Probes into the Holder Adaptation.

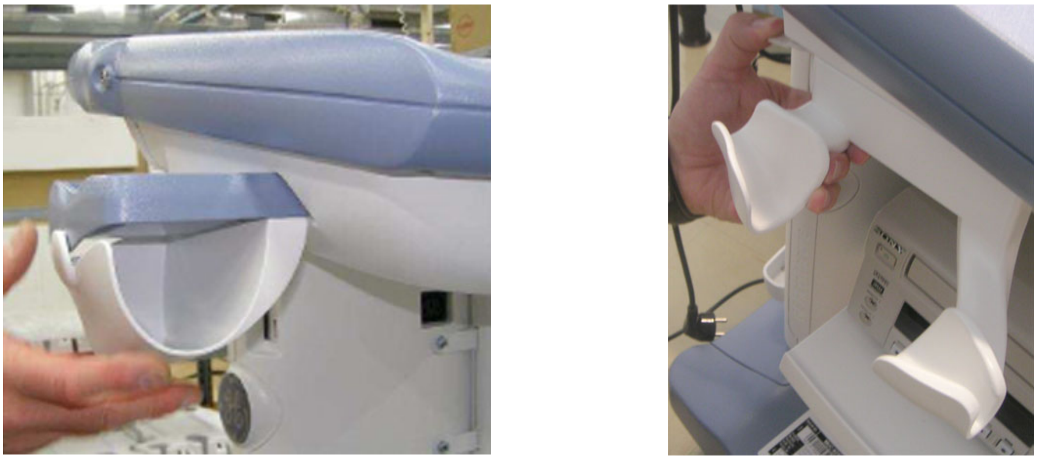


Figure 3-41 Installation Gel Condom Holder / Probe Holder for Endocavity Probes

3-5-3-3 Installation of the Additional Shelf Peripherals

1.) Place the Additional Shelf and fasten it with the 2 screws.

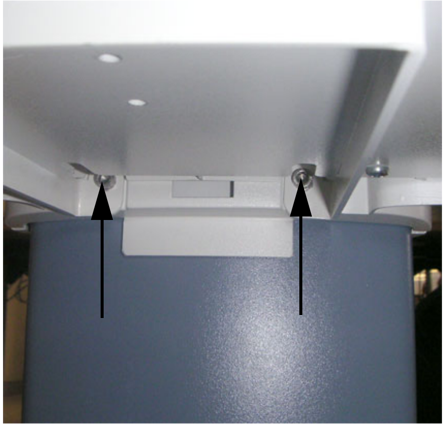


Figure 3-42 Installation Additional Shelf Peripherals

3-5-3-4 Installation of the Console Bottom Shelf

1.) Place the Console Bottom Shelf and fasten it with the 2 screws.

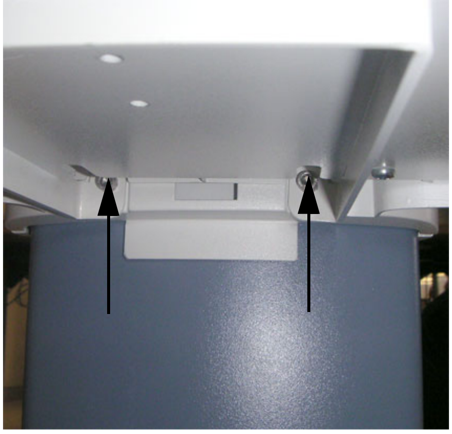


Figure 3-43 Installation Console Bottom Shelf

3-5-3-5 Installation of the Cover BW Printer Shelf

1.) Align tab on the front of the Printer Shelf Cover with the slot in front of the Printer Shelf; press down and snap into place.

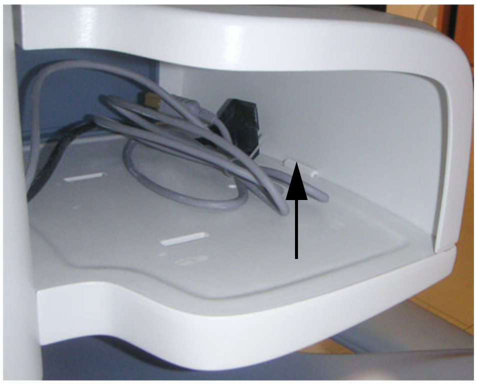


Figure 3-44 Installation Cover BW Printer Shelf

3-5-3-6 Installation of the Patient Monitor

1.) Screw out 2 screws on the Back Handle.

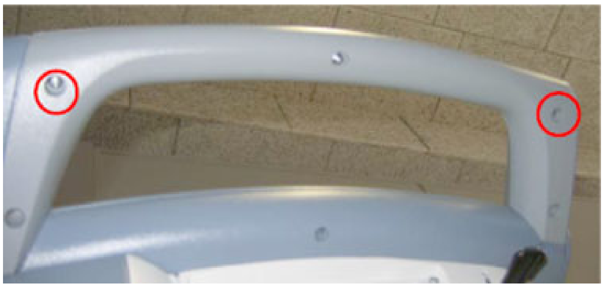


Figure 3-45 screw out 2 screws

2.) Insert the right and the left Adapter and fix it with the 2 screws (see Figure 3-45, above).

3.) Fix the tripod with a thumbscrew on the Adapter.

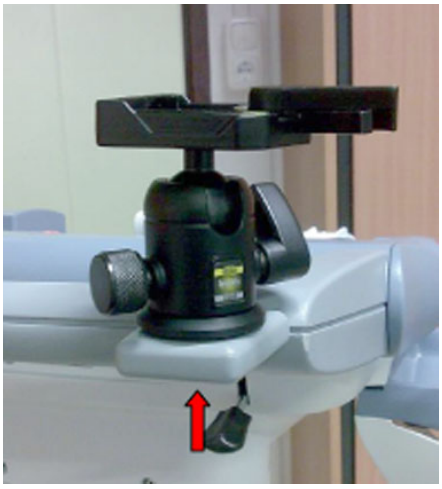


Figure 3-46 fix the tripod

4.) Fix the head plate from the tripod with a screw on the monitor.

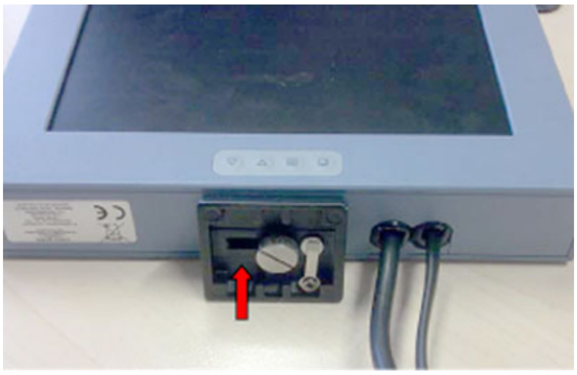


Figure 3-47 fix the Head Plate

5.) Connect the VGA-Cable to the VGA Connector and connect the Power Cable on the rear of the Voluson Station.

3-5-3-7 Installation of the Probe Mux Box Voluson Station

1.) Fasten the Probe Mux Box with the 4 screws.

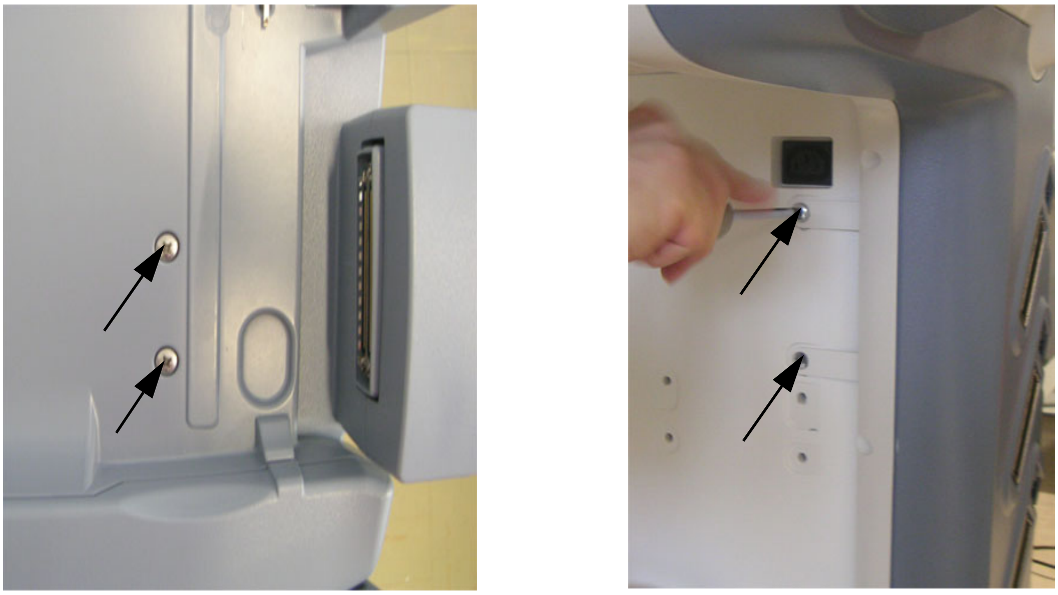


Figure 3-48 Installation Probe Mux Box

2.) Push the probe connector into the probe socket of the Voluson i / Voluson e and lift the system's locking lever upwards to lock the probe connector.

NOTE: *The docking lever cannot be operated if the Probe Box is connected to the Voluson i / Voluson e.*

3-5-3-8 Mounting small Peripherals (e.g., Black & White Printer)

1.) Screw out the screws of the leveling feet from the printer.

2.) Mount the adapter board with the 4 screws on the printer (leveling feet are also mounted).

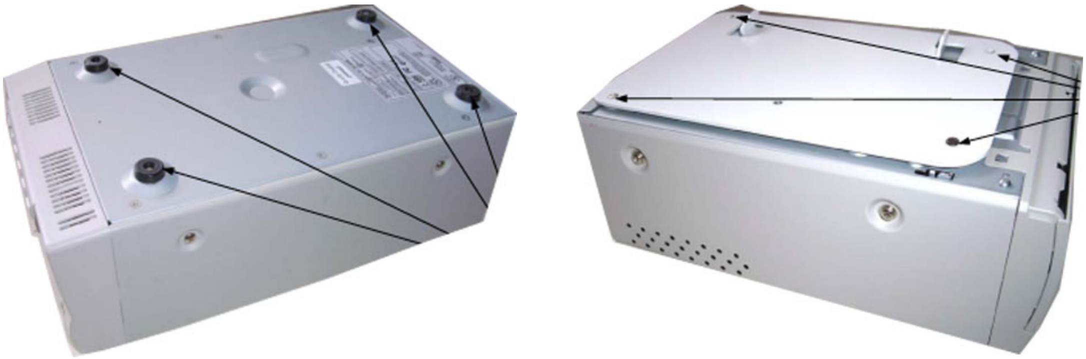


Figure 3-49 screw of the 4 screws / mount the adapter board

NOTE: *Pay attention to the right mounting position of the printer.*

3.) Put the pre-assembled Printer on the Console Bottom Shelf.

4.) Place the locking teeth of the adapter board into the guide slots of the shelf and move the Printer in the final mounting position.

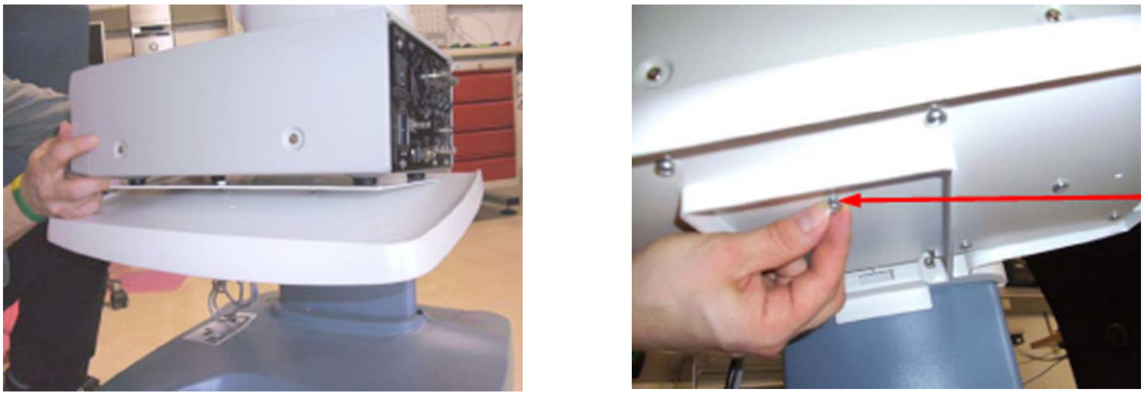
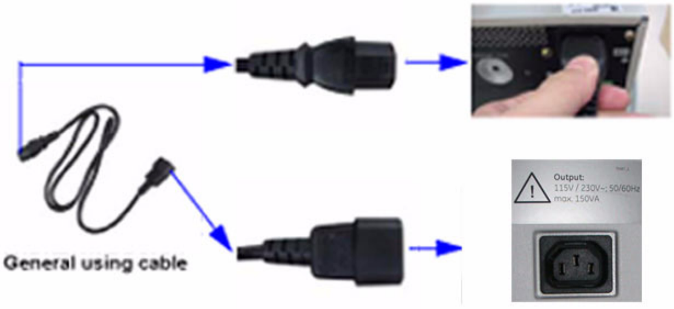


Figure 3-50 put the pre-assembled Printer on the Shelf / mount the adapter board

5.) Mount the adapter board with 1 screw on the Console Bottom Shelf (see Figure 3-50, above).

6.) Connect the peripheral device and mount the pull out protection of the power cable.
Links to connection schemes can be found in Table 3-9, “Connection Procedures,” on page 3-23.



Connect B/W printer
or Color printer

Connect Power
Distribution

Figure 3-51 Connect peripheral device to the Voluson Station

7.) Place the Cover BW Printer Shelf at its original position.

3-5-3-9 Mounting large Peripherals (e.g., VCR)

1.) Screw out the screws of the leveling feet from the VCR.
2.) Mount the adapter board with the 4 screws on the VCR (leveling feet are also mounted).

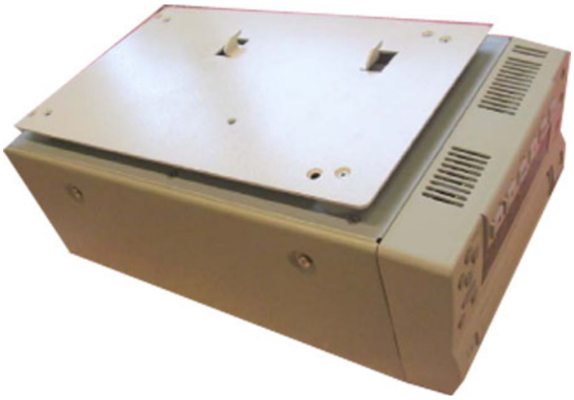


Figure 3-52 mount the adapter board

NOTE: Pay attention to the right mounting position of the printer.

3.) Put the pre-assembled VCR on the Additional Shelf Peripherals.
4.) Place the locking teeth of the adapter board into the guide slots of the shelf and move the VCR in the final mounting position.

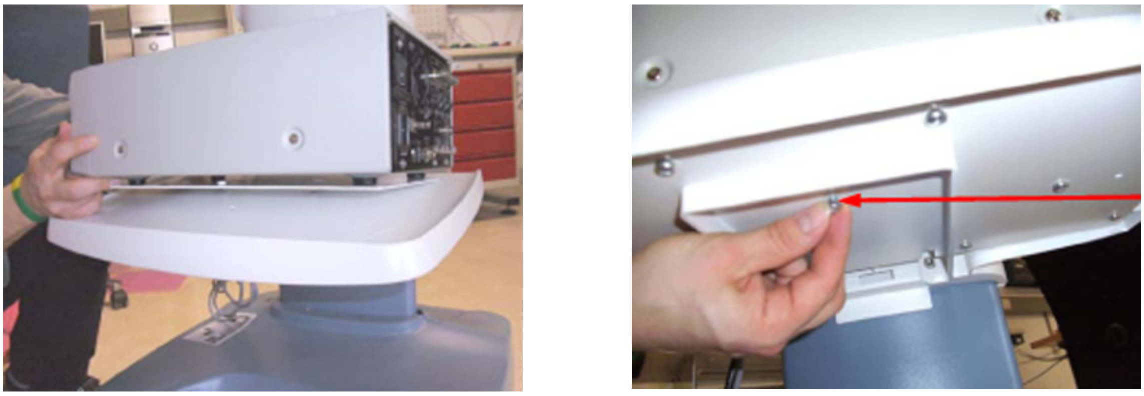


Figure 3-53 put the pre-assembled VCR on the Shelf / mount the adapter board

5.) Mount the adapter board with 1 screw on the Additional Shelf Peripherals (see Figure 3-53, above).
6.) Connect the peripheral device and mount the pull out protection of the power cable. Links to connection schemes can be found in Table 3-9, “Connection Procedures,” on page 3-23.

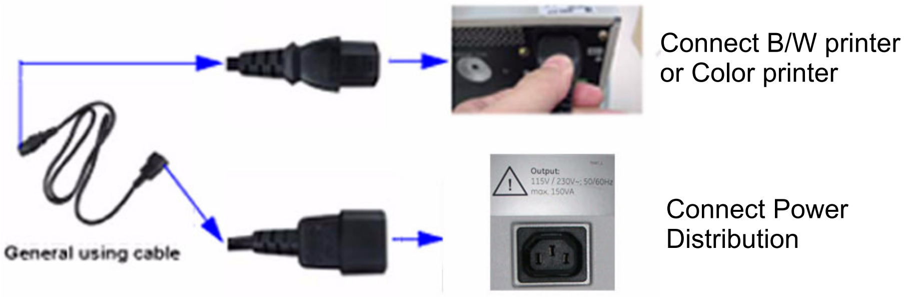

Connect B/W printer
or Color printer
General using cable
Output:
115V / 230V~; 50/60Hz
max. 150VA
Connect Power
Distribution

Figure 3-54 Connect peripheral device to the Voluson Station

3-5-4 Connecting the Wireless Network Adapter/Interface

3-5-4-1 Connection directly to the Voluson i / Voluson e system

The Wireless Network adapter should be connected to the PCMCIA slot at the rear of the Voluson i / Voluson e.
The Wireless Network Interface should be connected to the USB-Ports at the rear of the Voluson i / Voluson e.

NOTE: *You only can use the Network Adapter* ***or*** *the the Network Interface.*

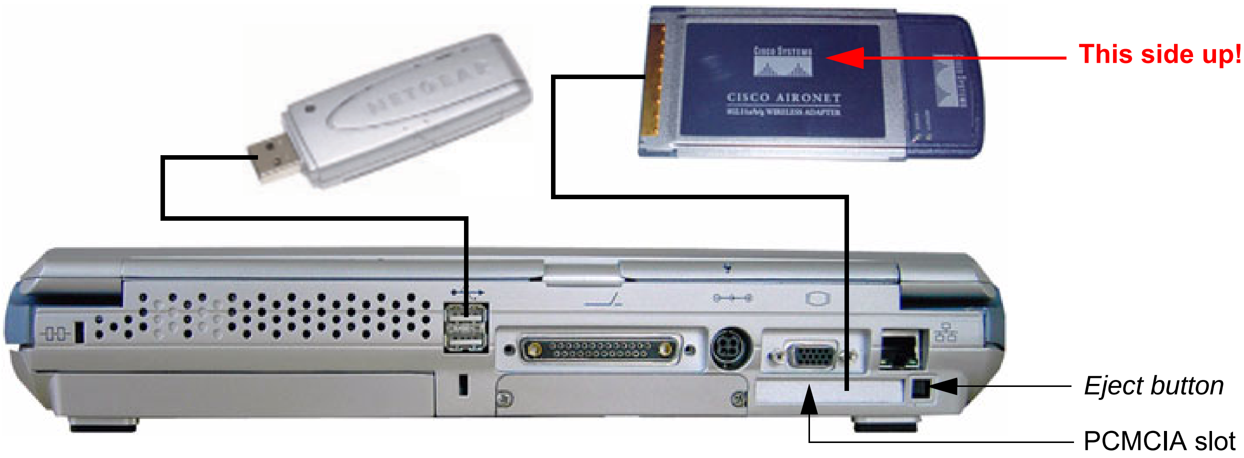


Figure 3-55 Connection Scheme - Wireless CardBus Network Adapter / Wireless Network Interface

1.) Power off/Shutdown the system as described in: Section 3-6-3 on page 3-72.
2.) Insert the Wireless Client Network adapter into the PCMCIA slot or the Wireless Network Interface into the USB-Port at the rear of the Voluson i / Voluson e.
All software drivers are pre-installed for the designated Wireless Network adapter only.
3.) Turn ON the power of the system and wait till the system has booted.

NOTE: *After physical connection of the WLAN adapter/WLAN Interface to the Voluson i / Voluson e system, follow the procedure described in Section 3-11-1-7 "Wireless Network Configuration" on page 3-110.*

3-5-4-2 Voluson i / Voluson e mounted on Modo Cart

The Wireless Network adapter should be connected to the PCMCIA slot at the rear of the Voluson i / Voluson e. Whenever moving the system with the Wireless Network adapter installed, make sure you do not damage the adapter.

3-5-4-3 Voluson i / Voluson e mounted on Dock Cart

The Wireless Network adapter should be connected to the PCMCIA slot at the rear of the Voluson i / Voluson e. Whenever moving the system with the Wireless Network adapter installed, make sure you do not damage the adapter.

3-5-4-4 Voluson i / Voluson e mounted on Voluson Station

The Wireless Network adapter should be connected to the PCMCIA slot at the rear of the Voluson i / Voluson e. Whenever moving the system with the Wireless Network adapter installed, make sure you do not damage the adapter.

The Wireless Network Interface should be connected to the USB ports in the middle of the Voluson Station.

3-5-5 General Remarks and Hints when using external USB-Devices

⚠ **WARNING** ***Do not connect or disconnect any external USB-devices to or from the system while scanning a patient! The appearing dialogs could distract you from the scan!***

3-5-5-1 External USB-Devices - Connection

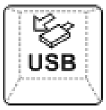
When an external USB-storage device (such as a USB-memory stick or an external hard disk) is connected to the Voluson i / Voluson e, Windows detects the device and automatically installs a driver. During this process, several dialogs may pop up, starting with the „Found New Hardware“ dialog.

NOTE: If an external drive was not recognized automatically after connecting it, click RESCAN DRIVE.

The device is then accessible using the drive letter the system assigned to it.

⚠ **NOTICE** When connecting external USB devices, be sure to execute Safety Directions found in the Voluson i / Voluson e Basic User Manual.

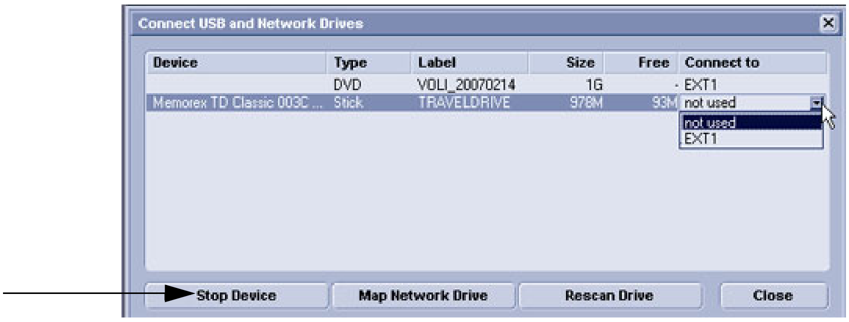
3-5-5-2 External USB-Devices - Disconnection



Before an external USB-device (e.g., USB-memory stick) can be disconnected, the system has to be informed about the removal of the device! For this purpose press the **USB** button on the keyboard.

⚠ **CAUTION** **Unplugging or ejecting USB devices without first stopping them can often cause the system to crash and possibly result in loss of valuable data.**

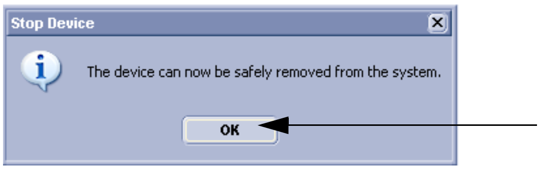
By pressing the **USB** key on the keyboard, a dialog window (see: Figure 3-56 below) is displayed. The “Connect USB and Network Drives” window shows all USB and Network drives connected to the system. Using this dialog, the USB-devices can be stopped before they are physically disconnected.



Device	Type	Label	Size	Free	Connect to
	DVD	VOLI_20070214	1G	-	EXT1
Memorex TD Classic 003C ...	Stick	TRAVELDRIVE	978M	93M	not used

Figure 3-56 Connect USB and Network Drives

To stop the external device, select it and then click the STOP DEVICE button.



The device can now be safely removed from the system.

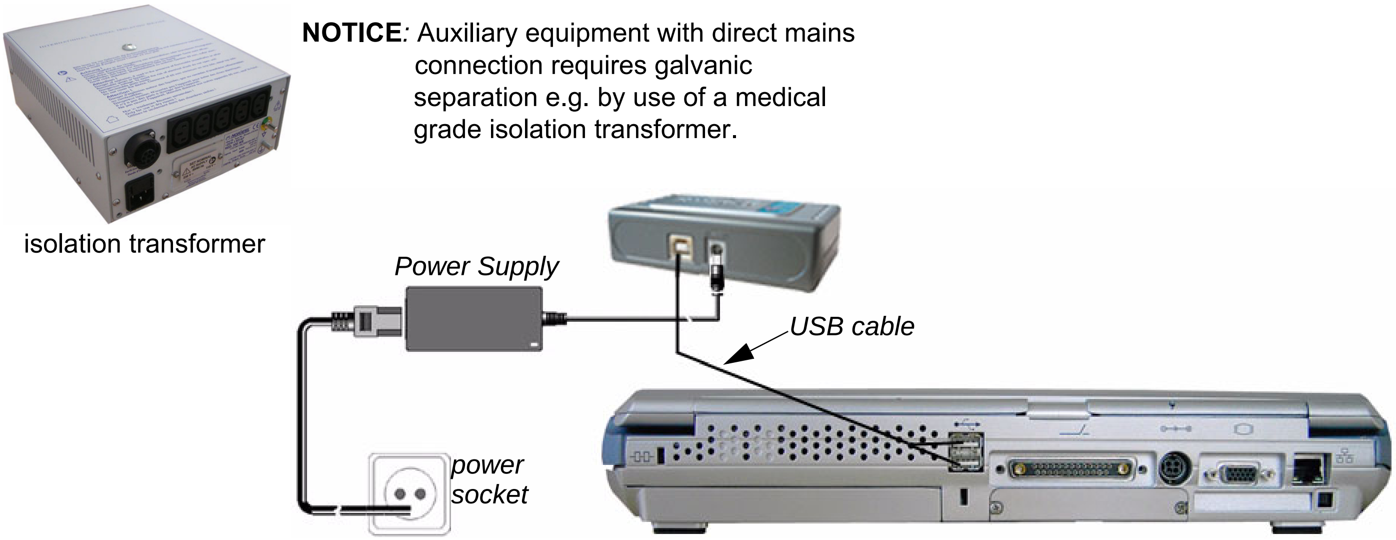
Figure 3-57 Device can now be safely removed

Confirm the ‘Stop Device‘ dialog with OK.
Then CLOSE the “Connect USB and Network Drives” window (see: Figure 3-56, above).

3-5-6 Connecting the USB Hub

3-5-6-1 Connection directly to the Voluson i / Voluson e system

The USB Hub can be connected to the USB ports on the rear connector panel.



NOTICE: Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

Figure 3-58 Connection Scheme - USB Hub

CAUTION When connecting directly to the system, it is necessary to use additional AC/DC power supply (supplied with the drive). **As a safety requirement, the AC/DC must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

NOTICE Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

The USB Hub can be connected once the system is powered ON, or after shutdown.

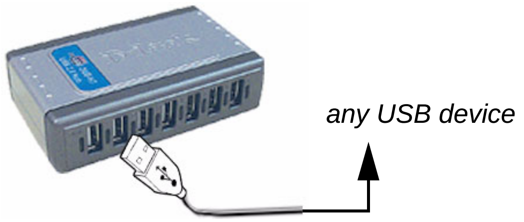


Figure 3-59 Connection to USB Hub

3-5-6-2 Voluson i / Voluson e mounted on Modo Cart

The USB Hub may be connected to the USB ports on the rear of the Voluson i / Voluson e.
A power cable that extends from the power outlets of the Modo Cart´s isolation transformer should be used to connect the power supply of the USB Hub.

3-5-6-3 Voluson i / Voluson e mounted on Dock Cart

Not available with the Dock Cart.

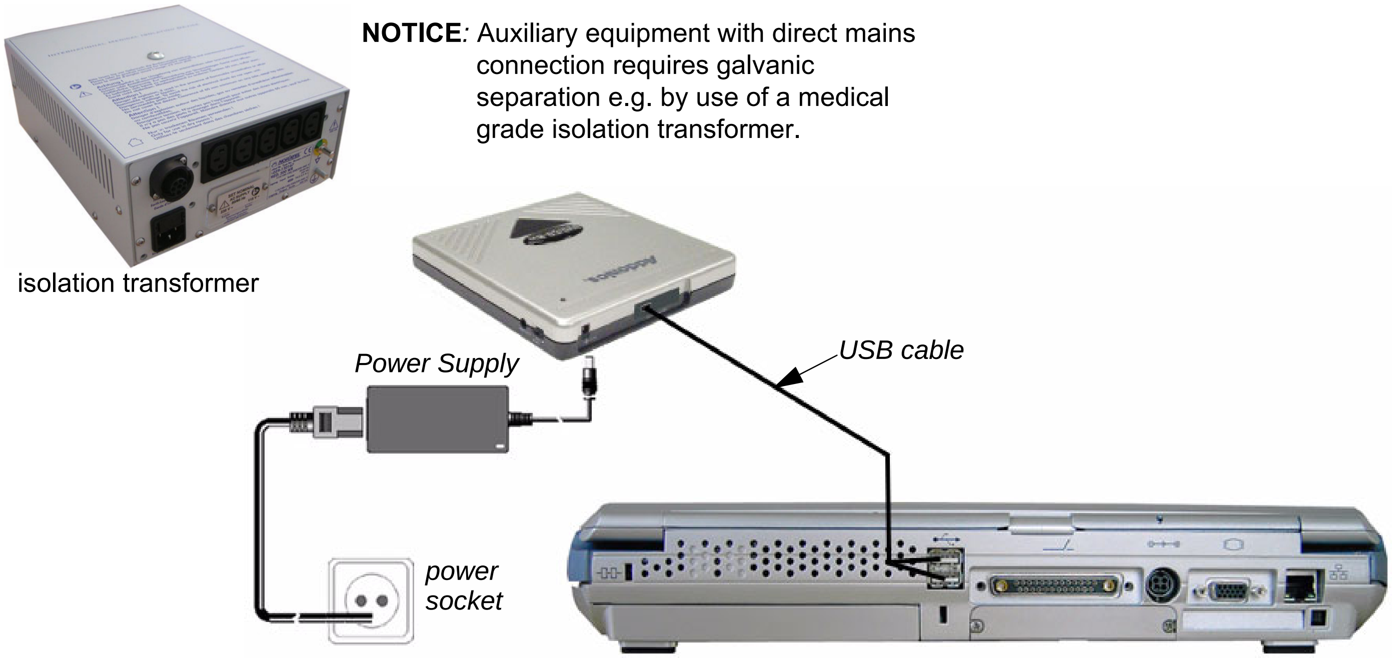
3-5-6-4 Voluson i / Voluson e mounted on Voluson Station

Not available with the Voluson Station.

3-5-7 Connecting the DVD+R/RW Drive

3-5-7-1 Connection directly to the Voluson i / Voluson e system

The DVD+R/RW Drive can be connected to the USB ports on the rear connector panel.



NOTICE: Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

Figure 3-60 Connection Scheme - DVD+R/RW Drive

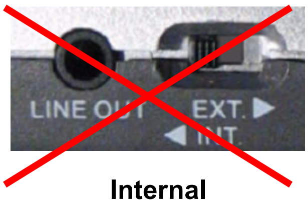
⚠ **CAUTION** When connecting directly to the system, it is necessary to use additional AC/DC power supply (supplied with the drive). **As a safety requirement, the AC/DC must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

⚠ **NOTICE** Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

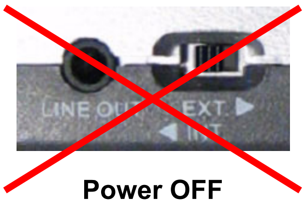
NOTE: The connection Scheme for DVD Drive Samsung, De-Lock and Teac is similary the same.

3-5-7-1 Connection directly to the Voluson i / Voluson e system (cont'd)

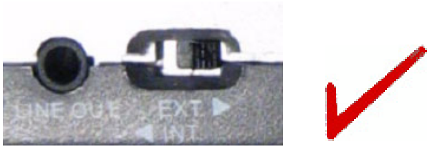
*NOTE: The power switch on the rear of the DVD drive (Addonics only) must be set in the **External** position, as shown below:*



Internal



Power OFF



External

CAUTION When connecting directly to the system, it is necessary to use additional power supply (supplied with the drive). **As a safety requirement, this must be done via an isolation transformer.**

The DVD+R/RW Drive can be connected once the system is powered ON, or after shutdown.

NOTICE **IMPORTANT** During software installation, the DVD drive **must be connected directly** to the Voluson i / Voluson e portable ultrasound system.

NOTE: When connecting the DVD+R/RW Drive to the Voluson i / Voluson e system, it might be possible that the Drive is not recognized in the "Connect USB and Network Drives" dialog window.
To check connection, perform: Section 3-5-7-5-1 "After physical connection" on page 3-48.

3-5-7-2 Connection via USB hub

As stated above.
Safety considerations must be taken into account.
The USB hub and the DVD+R/RW Drive must be powered via an isolation transformer.
An USB port may be used to communicate with the DVD device.

3-5-7-3 Voluson i / Voluson e mounted on Modo Cart

The DVD+R/RW Drive may be connected to the USB ports on the rear of the Voluson i / Voluson e. A power cable that extends from the power outlets of the Modo Carts isolation transformer should be used to connect the power supply of the DVD+R/RW drive.

The DVD+R/RW can be placed in the upper peripheral storage shelf on the Modo Cart (refer to Figure 3-10 on page 3-14). The power cable (described above) is then plugged into the rear of the DVD device and the data cable is connected to the USB port.

3-5-7-4 Voluson i / Voluson e mounted on Dock Cart

The DVD+R/RW Drive may be connected to the USB ports on the rear of the Voluson i / Voluson e. A power cable that extends from the power outlets of the Dock Carts power supply should be used to connect the power supply of the DVD+R/RW drive.

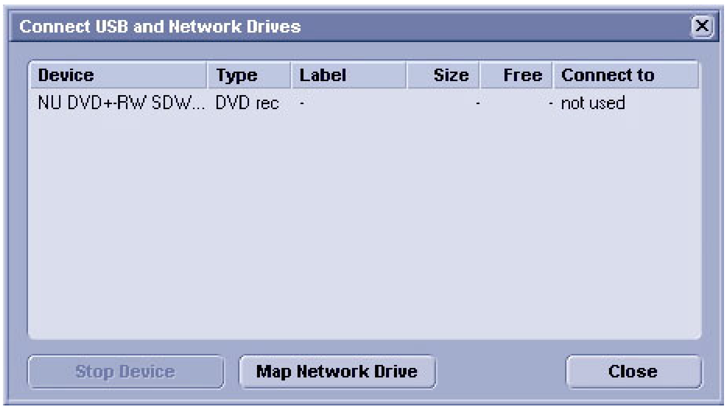
The DVD+R/RW should be placed in the Tray Recorder on the Dock Cart (refer to Figure 3-12 on page 3-16). The power cable (described above) is then plugged into the rear of the DVD device and the data cable is connected to the USB port.

3-5-7-5 Voluson i / Voluson e mounted on Voluson Station

The DVD+R/RW Drive is premounted on the Voluson Station.

3-5-7-5-1 After physical connection

1.) Press the USB button on the keyboard.
The “Connect USB and Network Drives” dialog window appears (Figure 3-61 below).


Connect USB and Network Drives
Stop Device
Map Network Drive
Close

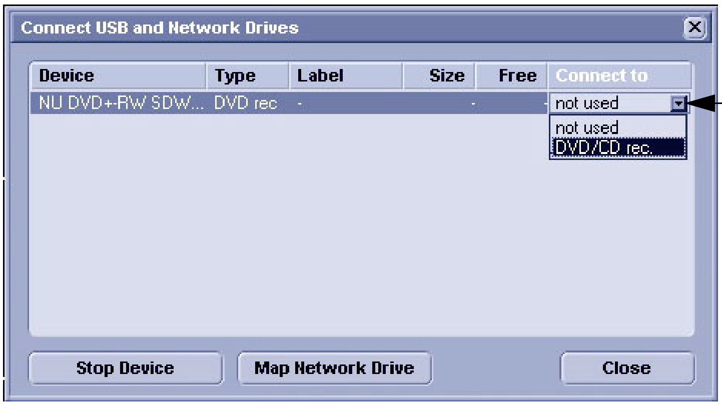
Device	Type	Label	Size	Free	Connect to
NU DVD+RW SDW...	DVD rec	-	-	-	not used

Figure 3-61 DVD drive “not used”

2.) If the [Connect to] field shows **not used** (see: Figure 3-61, above), double-click the “DVD line”.

BT Version: If an external drive was not recognized automatically after connecting it, click RESCAN DRIVE only on systems with BT’07 software.(see:Figure 3-56 on page 3-44)

3.) Click on the arrow icon below the [Connect to] field and select **DVD/CD rec** from the pop-up menu.


Connect USB and Network Drives
not used
DVD/CD rec.
Stop Device
Map Network Drive
Close

Device	Type	Label	Size	Free	Connect to
NU DVD+RW SDW...	DVD rec	-	-	-	not used

arrow icon to open the pop-up menu

Figure 3-62 change to “DVD/CD rec”

4.) CLOSE the dialog window.

3-5-8 Connecting the USB Flash Memory Stick

3-5-8-1 Connection directly to the Voluson i / Voluson e system

The USB Flash Memory Stick may be connected to the USB ports on the rear connectors panel.

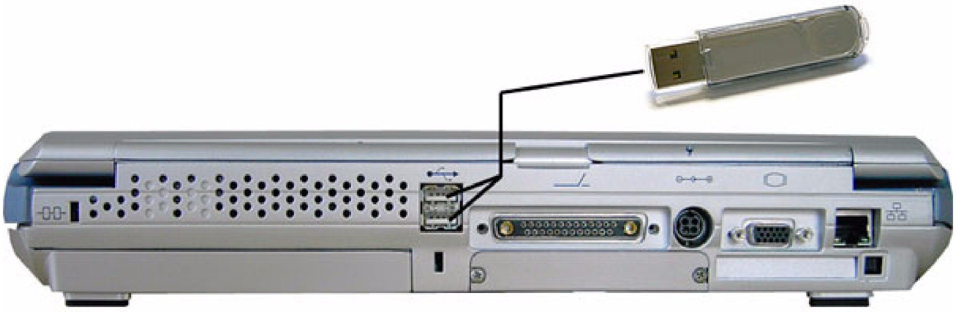


Figure 3-63 Connection Scheme - USB Flash Memory Stick

An external USB Flash Memory Stick can be connected once the system is powered ON, or after shutdown. The Voluson i / Voluson e, Windows detects the device and automatically installs a driver. During this process several dialogs may pop up, starting with the „Found New Hardware“ dialog.

NOTE: *Memory drives or sticks may be sensitive to EMC interference.*
This may affect system performance and/or image quality.

⚠ **NOTICE** Before disconnecting an external the system has to be informed about the removal of the device! Operation see: Section 3-5-5-2 "External USB-Devices - Disconnection" on page 3-44.

3-5-8-2 Connection via USB hub

As above. If applicable, the USB hub must be powered via the isolation transformer.

3-5-8-3 Voluson i / Voluson e mounted on Modo Cart

As above.

3-5-8-4 Voluson i / Voluson e mounted on Dock Cart

As above.

3-5-8-5 Voluson i / Voluson e mounted on Voluson Station

As above.

3-5-9 Connecting the external USB Hard disk (Handydrive)

3-5-9-1 Connection directly to the Voluson i / Voluson e system

The external “Handydrive” HDD may be connected to the USB ports on the rear connectors panel.

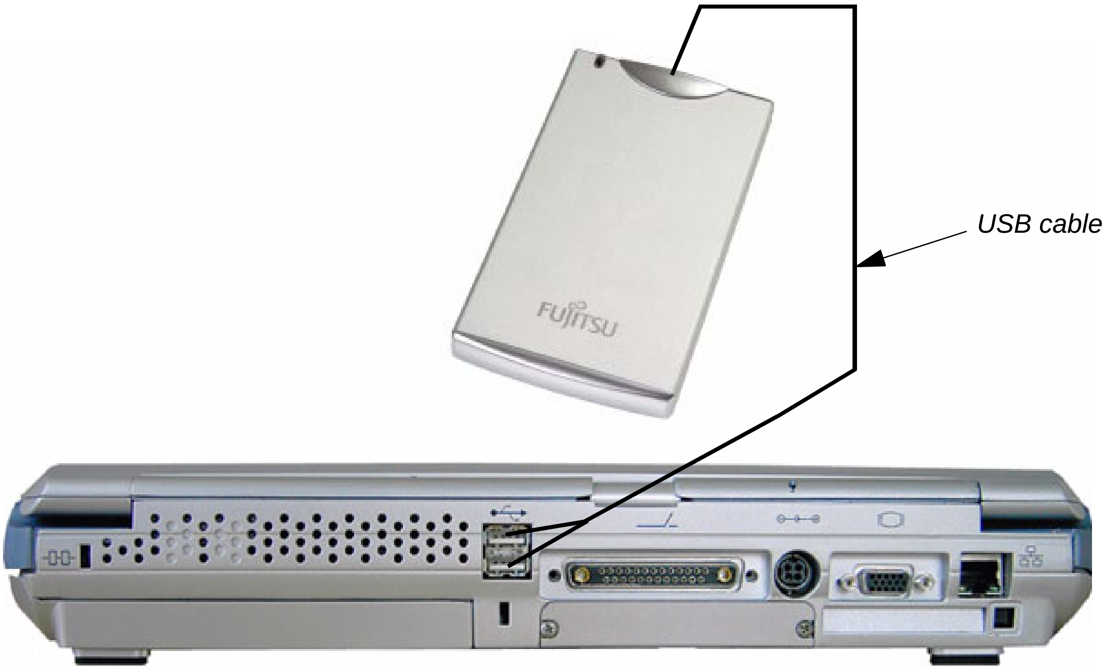


Figure 3-64 Connection Scheme - external USB HDD (Handydrive)

An external USB Hard disk can be connected once the system is powered ON, or after shutdown. The Voluson i / Voluson e, Windows detects the device and automatically installs a driver. During this process several dialogs may pop up, starting with the „Found New Hardware“ dialog.

NOTE: Memory drives or sticks may be sensitive to EMC interference.
This may affect system performance and/or image quality.

⚠ **NOTICE** Before disconnecting an external the system has to be informed about the removal of the device! Operation see: Section 3-5-5-2 "External USB-Devices - Disconnection" on page 3-44.

3-5-9-2 Connection via USB hub

As above. If applicable, the USB hub must be powered via the isolation transformer.

3-5-9-3 Voluson i / Voluson e mounted on Modo Cart

As above.

3-5-9-4 Voluson i / Voluson e mounted on Dock Cart

As above.

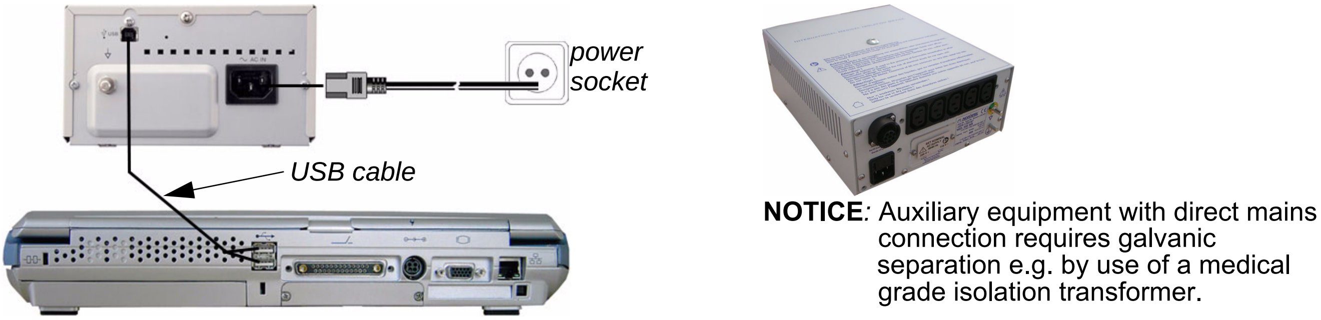
3-5-9-5 Voluson i / Voluson e mounted on Voluson Station

As above.

3-5-10 Connecting the Black & White Printer

3-5-10-1 Connection directly to the Voluson i / Voluson e system

The B/W Printer can be connected to the USB ports (***upper*** or ***lower***) on the rear connectors panel.



NOTICE: Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

Figure 3-65 Connection Scheme - Black & White Printer

CAUTION When connecting the B/W Printer directly to the system, it is necessary to use an additional power source. **As a safety requirement, the B/W printer internal AC/DC must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

NOTICE Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

NOTE: For installation instructions see: Installing Digital Black & White Printer Sony UP-D897 on page 3-81.

NOTE: After physical connection of the printer to the Voluson i / Voluson e system: To assign a key to the B/W printer, follow the instructions in *Section 3-7-6 "Printer Remote Control Selection" on page 3-97.*

NOTICE The switch of the printer has to be in ON position before starting the system.
Leave printer switch always in the ON position.

3-5-10-2 Connection via USB hub

As stated above. Safety considerations must be taken into account. The B/W Printer must be powered via an isolation transformer. An USB port may be used to communicate with the device.

3-5-10-3 Voluson i / Voluson e mounted on Modo Cart

NOTE: For Instructions see: Mounting small Peripherals (e.g., Black & White Printer) on page 3-27.

The B/W Printer may be connected to the USB ports on the rear of the Voluson i / Voluson e.
The B/W Printer must be powered from the Modo Cart itself, via one of the isolated peripheral power cables provided on the Modo Cart.

3-5-10-4 Voluson i / Voluson e mounted on Dock Cart

NOTE: For Instructions see: Mounting small Peripherals (e.g., Black & White Printer) on page 3-33.

The B/W Printer may be connected to the USB ports on the rear of the Voluson i / Voluson e.
The B/W Printer must be powered from the Dock Cart itself, via one of the isolated peripheral power cables provided on the Dock Cart.

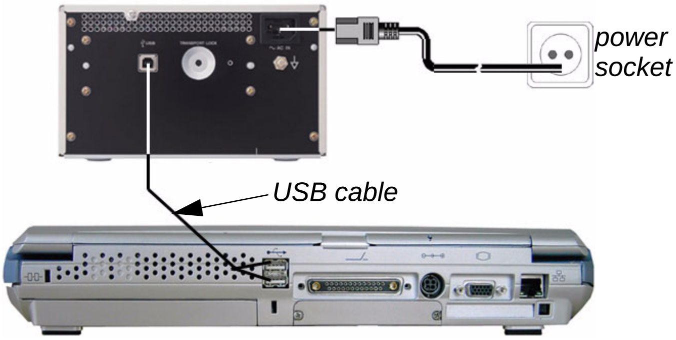
3-5-10-5 Voluson i / Voluson e mounted on Voluson Station

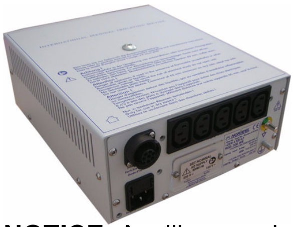
NOTE: For Instructions see: Mounting small Peripherals (e.g., Black & White Printer) on page 3-41.

3-5-11 Connecting the Color Printer

3-5-11-1 Connection directly to the Voluson i / Voluson e system

The Color Printer can be connected to the USB ports (***upper*** or ***lower***) on the rear connectors panel.





NOTICE: Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

Figure 3-66 Connection Scheme - Color Printer

⚠ **CAUTION** When connecting the Color Printer directly to the system, it is necessary to use an additional power source. **As a safety requirement, the Color Printer internal AC/DC must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

NOTE: *For installation instructions see:*
Section 3-7-2 "Installing Digital Color Printer Sony UP-D23MD or UP-D25MD" on page 3-83.

NOTE: After physical connection of the printer to the Voluson i / Voluson e system: To assign a key to the Color printer, follow the instructions in *Section 3-7-6 "Printer Remote Control Selection" on page 3-97.*

⚠ **NOTICE** The switch of the printer has to be in ON position before starting the system.
Leave printer switch always in the ON position.

3-5-11-2 Connection via USB hub

As stated above. Safety considerations must be taken into account. The Color Printer must be powered via an isolation transformer. An USB port may be used to communicate with the device.

3-5-11-3 Voluson i / Voluson e mounted on Modo Cart

NOTE: *For instructions see: Section 3-5-1-3 "Mounting large Peripherals (e.g., Color Printer)" on page 3-28.*

The Color Printer may be connected to the USB ports on the rear of the Voluson i / Voluson e.
The Color Printer must be powered from the Modo Cart itself, via one of the isolated peripheral power cables provided on the Modo Cart.

3-5-11-4 Voluson i / Voluson e mounted on Dock Cart

NOTE: *For instructions see: Section 3-5-2-6 "Mounting large Peripherals (e.g., Color Printer)" on page 3-34.*

The Color Printer may be connected to the USB ports on the rear of the Voluson i / Voluson e.
The Color Printer must be powered from the Dock Cart itself, via one of the isolated peripheral power cables provided on the Dock Cart.

3-5-11-5 Voluson i / Voluson e mounted on Voluson Station

NOTE: *For instructions see: Section 3-5-3-9 "Mounting large Peripherals (e.g., VCR)" on page 3-42.*

3-5-12 Connecting the DeskJet Color Printer

3-5-12-1 Connection via Bluetooth Adapter

The DeskJet Color Printer can be connected to an external, non-isolated power source. The bluetooth adapter should be directly connected to the ***upper*** USB port on the Voluson i / Voluson e rear connectors panel.

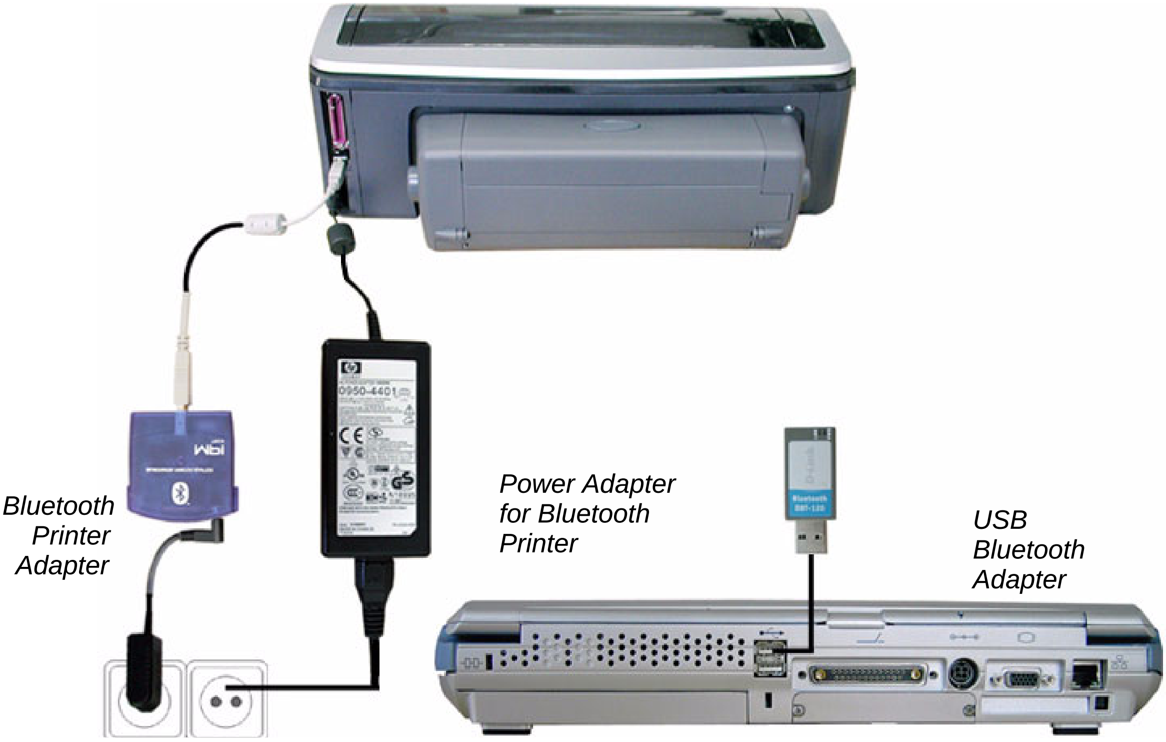

Bluetooth Printer Adapter
Power Adapter for Bluetooth Printer
USB Bluetooth Adapter

Figure 3-67 HP5940 DeskJet Printer connection (via Bluetooth Adapter)

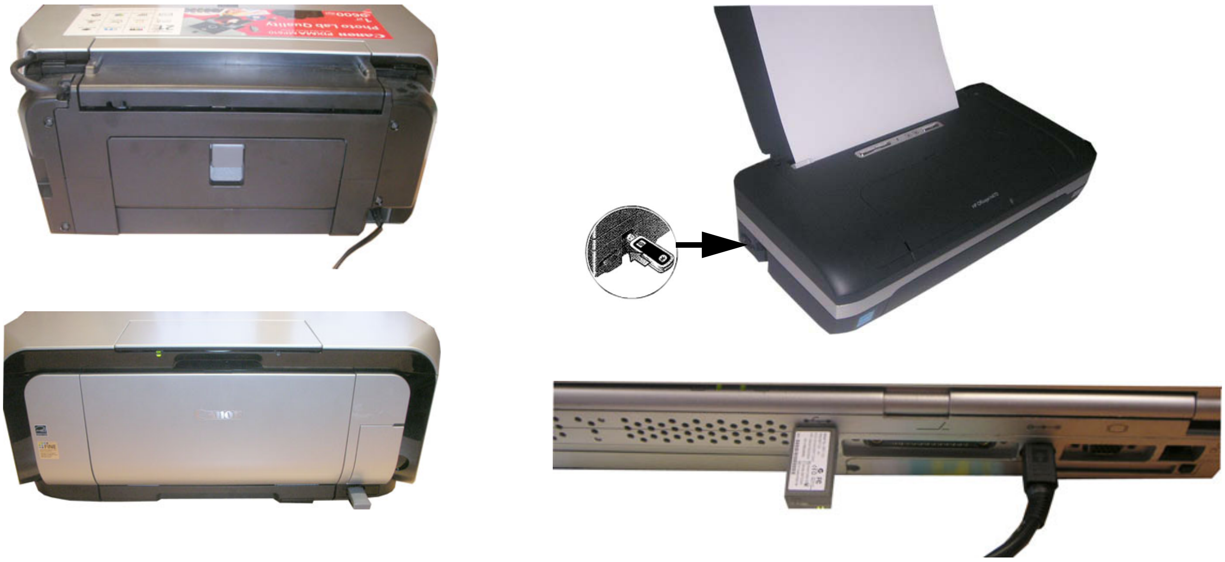


Figure 3-68 Canon Pixma MP600/MP610, MP550 and HP H470 Printer connection (via Bluetooth Adapter)

3-5-12-1 Connection via Bluetooth Adapter (cont'd)

NOTE: ***DO NOT connect the Bluetooth adapter via USB hub, to the*** *Modo Cart* ***or to the*** *Dock Cart* ***or to the*** *Voluson Station****.***
This is not an approved configuration.
In most cases, it will not work and will cause software complications.

CAUTION **The printer being used may not be a medical device. The Bluetooth Printer Set and the Power Supply of the Bluetooth Printer Adapter is also not a medical device.**
The equipment meets the requirements of the EN 60950 Standard.

CAUTION **Please observe that the complete Bluetooth Printer Assembly has to be located outside of the patient environment (according to IEC 60601-1 / UL 60601-1).**

NOTICE Please use the proper Bluetooth Printer Connection set. See: Chapter 9 - Printers on page 9-27.
You also can connect the Printer directly with an USB-cable. If so, please ensure to use the AC mains power outlet provided by the Voluson Station / Voluson Dock Cart (auxiliary output) to ensure medical grade separation from AC mains.
If you have a Voluson i/e only and you use the USB-cable you need to connect the AC mains of the printer to a medical grade Isolation Transformer.

3-5-13 Connecting the VCR (VideoCassette Recorder)

NOTE: There are 2 types of Mitsubishi HS-MD3000 VCR (PAL and NTSC) approved by GE.

3-5-13-1 Direct Connection to the Voluson i / Voluson e system

Use the standard VCR type (PAL or NTSC) that is suited to your region.
The video signal is received through a VGA-to-video converter.

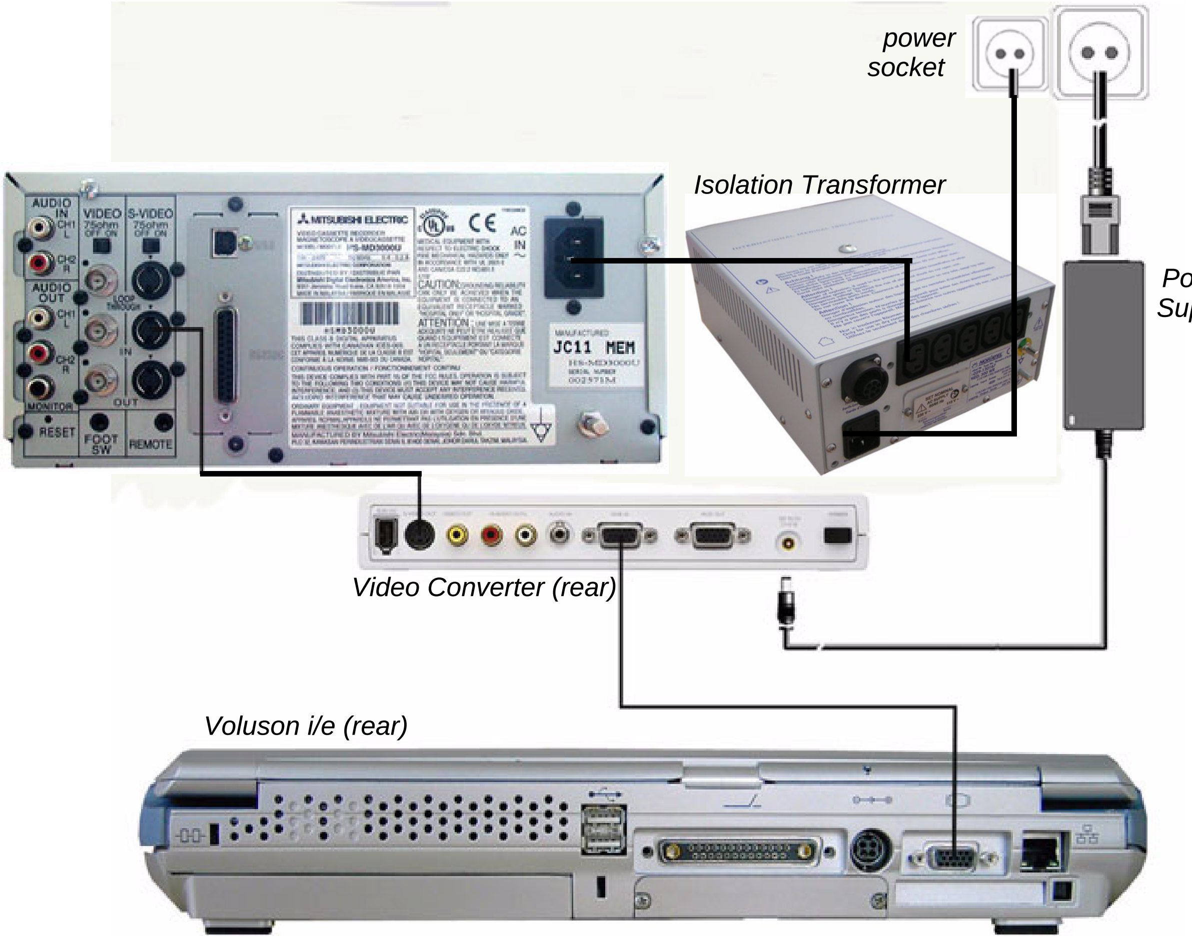

power socket
Isolation Transformer
Power Supply
Video Converter (rear)
Voluson i/e (rear)

Figure 3-69 Connection Scheme - VCR with Video Scan Converter Canopus

3-5-13-1 Direct Connection to the Voluson i / Voluson e system (cont'd)

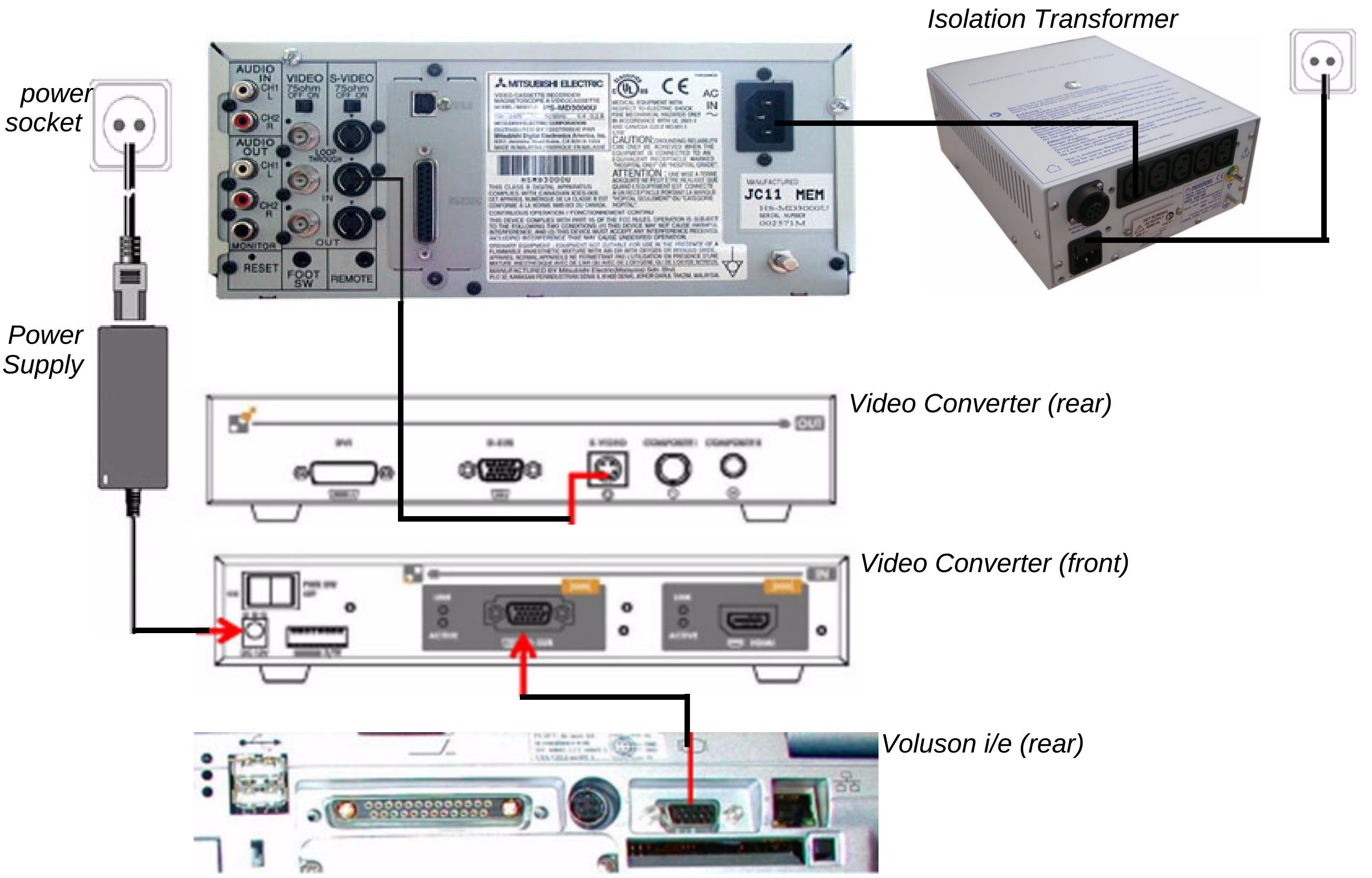


Figure 3-70 Connection Scheme - VCR with Video Scan Converter Ophit

CAUTION When connecting the VCR/Video Converter directly to the system, it is necessary to use an additional power source. **As a safety requirement, the VCR internal AC/DC and the Video Converter AC/DC (supplied with the Video Converter) must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

NOTICE Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

1.) Connect one end of the VGA cable to SVGA OUT located on the Voluson i / Voluson e rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter.
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the VCR.

3-5-13-1 Direct Connection to the Voluson i / Voluson e system (cont'd)

NOTE: Dip switches are located on the front respectively beneath the video converter, see Figure 3-71 below.

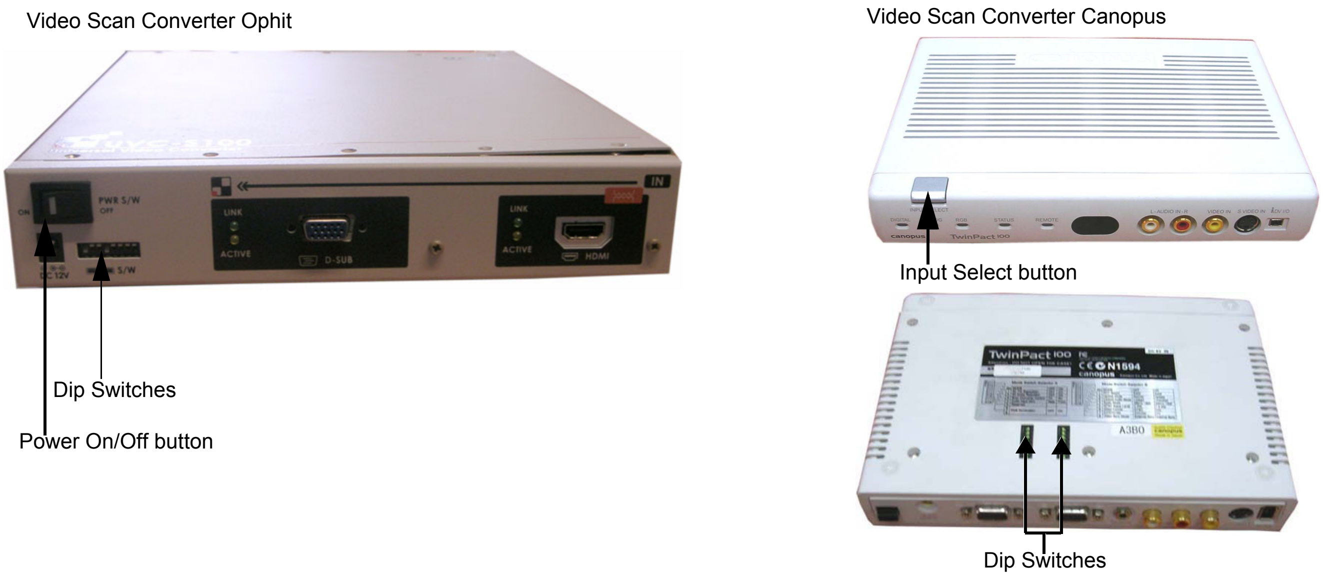

Video Scan Converter Ophit
Dip Switches
Power On/Off button
Video Scan Converter Canopus
Input Select button
Dip Switches

Figure 3-71 Video Converter Ophit (left image)/Video Converter Canopus (right image)

5.) If not already done, set the switches to the correct positions, as shown in Figure 3-72 below.

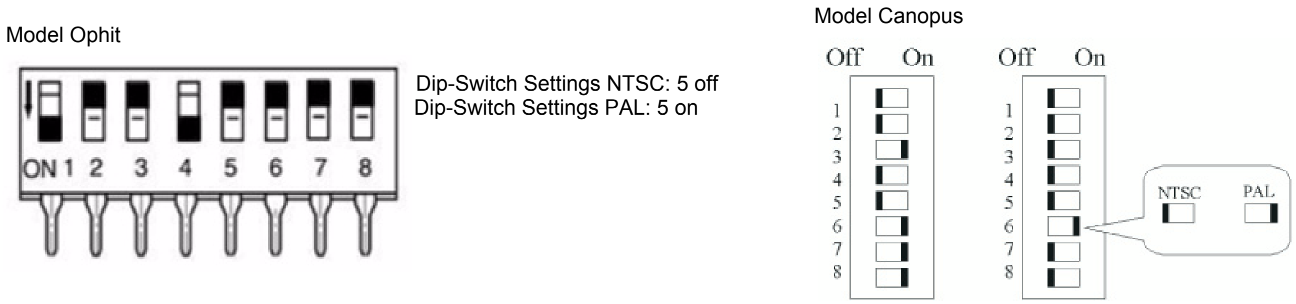

Model Ophit
ON 1 2 3 4 5 6 7 8
Dip-Switch Settings NTSC: 5 off
Dip-Switch Settings PAL: 5 on
Model Canopus
Off On
1 2 3 4 5 6 7 8
Off On
1 2 3 4 5 6 7 8
NTSC
PAL

Figure 3-72 Video Converter Dip Switch Positions

6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):

- a.) Press the power ON switch on the VCR.
- b.) Press the power ON switch on the video converter.
- c.) Turn ON power to the Voluson i / Voluson e system.

7.) Press the **Input Select** button (see Figure 3-71 on page 3-57) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.

NOTE: If the VGA cable is disconnected/reconnected while the system is ON, the VGA output is maintained.

NOTE: If system is shut-down to standby or Full-shut-down while the VGA device is connected continuously, the VGA output will appear after the system is turned ON.

NOTE: If the system is shut-down to Standby or Full-shut-down and the VGA device is disconnected, the VGA output will not appear after power is turned ON, and the above procedure will have to be repeated.

3-5-13-2 Voluson i / Voluson e mounted on Modo Cart

NOTE: *For instructions see: Section 3-5-1-3 "Mounting large Peripherals (e.g., Color Printer)" on page 3-28.*

The VCR must be powered from the Modo Cart itself, via one of the isolated peripheral power cables provided on the Modo Cart. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Modo Cart.

1.) Connect one end of the VGA cable to SVGA OUT located on the Voluson i / Voluson e rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter (rear).
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the VCR.

NOTE: *Dip switches are located beneath the video converter, as shown in Figure 3-71 on page 3-57.*

5.) Set the switches to the correct positions, as shown in Figure 3-72 on page 3-57.
6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the VCR.
    b.) Press the power ON switch on the video converter.
    c.) Turn ON power to the Voluson i / Voluson e system.
7.) Press the **Input Select** button (see Figure 3-71 on page 3-57) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.

3-5-13-3 Voluson i / Voluson e mounted on Dock Cart

NOTE: *For instructions see: Section 3-5-2-6 "Mounting large Peripherals (e.g., Color Printer)" on page 3-34.*

The VCR must be powered from the Dock Cart itself, via one of the isolated peripheral power cables provided on the Dock Cart. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Dock Cart.

1.) Connect one end of the VGA cable to SVGA OUT located on the Voluson i / Voluson e rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter (rear).
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the VCR.

NOTE: *Dip switches are located beneath the video converter, as shown in Figure 3-71 on page 3-57.*

5.) Set the switches to the correct positions, as shown in Figure 3-72 on page 3-57.
6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the VCR.
    b.) Press the power ON switch on the video converter.
    c.) Turn ON power to the Voluson i / Voluson e system.

Press the **Input Select** button (see Figure 3-71 on page 3-57) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.

3-5-13-4 Voluson i / Voluson e mounted on Voluson Station

NOTE: For instructions see: Section 3-5-3-9 "Mounting large Peripherals (e.g., VCR)" on page 3-42.

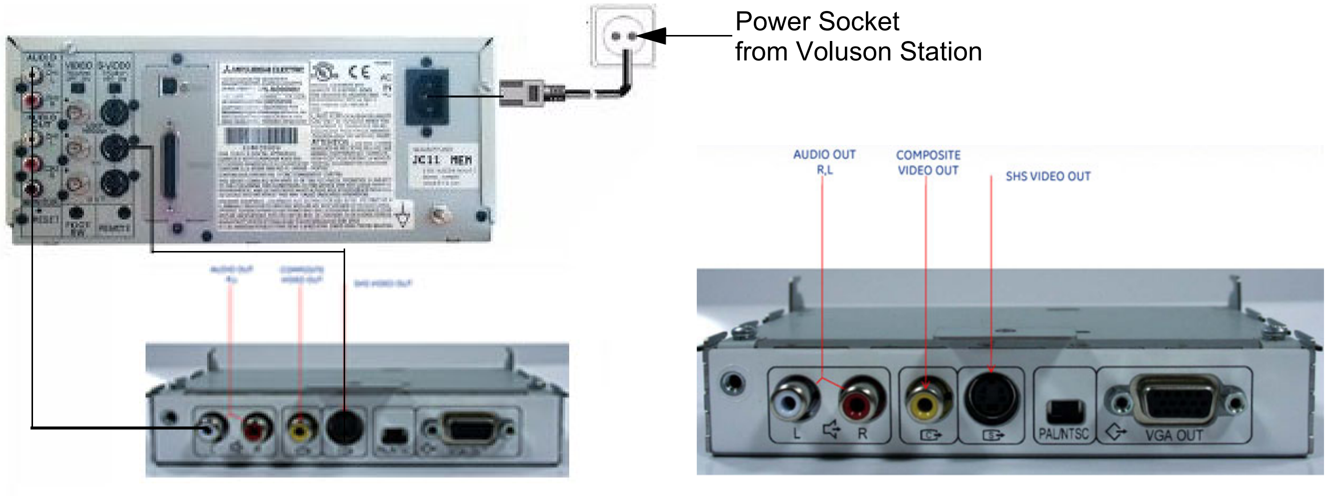


Figure 3-73 Connection Scheme

The VCR must be powered from the Voluson Station itself, via one of the isolated peripheral power cables provided on the Voluson Station. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Voluson Station.

1.) Connect one end of the Audio-cable to AUDIO OUT located on the Image Resizer of the Voluson Station.
2.) Connect the other end of the Audio-cable to AUDIO IN at the rear of the VCR.
3.) Connect one end of the S-Video cable to S-VIDEO OUT located on the Image Resizer of the Voluson Station.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the VCR.
5.) If not already done, set the switch to the correct positions (PAL or NTSC).
6.) When all power and signal cables are connected to the system, VCR, and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the VCR.
    b.) Turn ON power to the Voluson i / Voluson e system.
    c.) Press the Circuit breaker on the Voluson Station.

NOTE: Please make sure, that the VGA Port is enabled.

3-5-14 Connecting the DVD Recorder

NOTICE The Sony DVO-1000MD DVD recorder is **only** able to read and write on DVD**+RW** (ReWriteable) media! Please check on your DVD case before using.

3-5-14-1 Direct Connection to the Voluson i / Voluson e system

The video signal is received through a VGA-to-video converter.

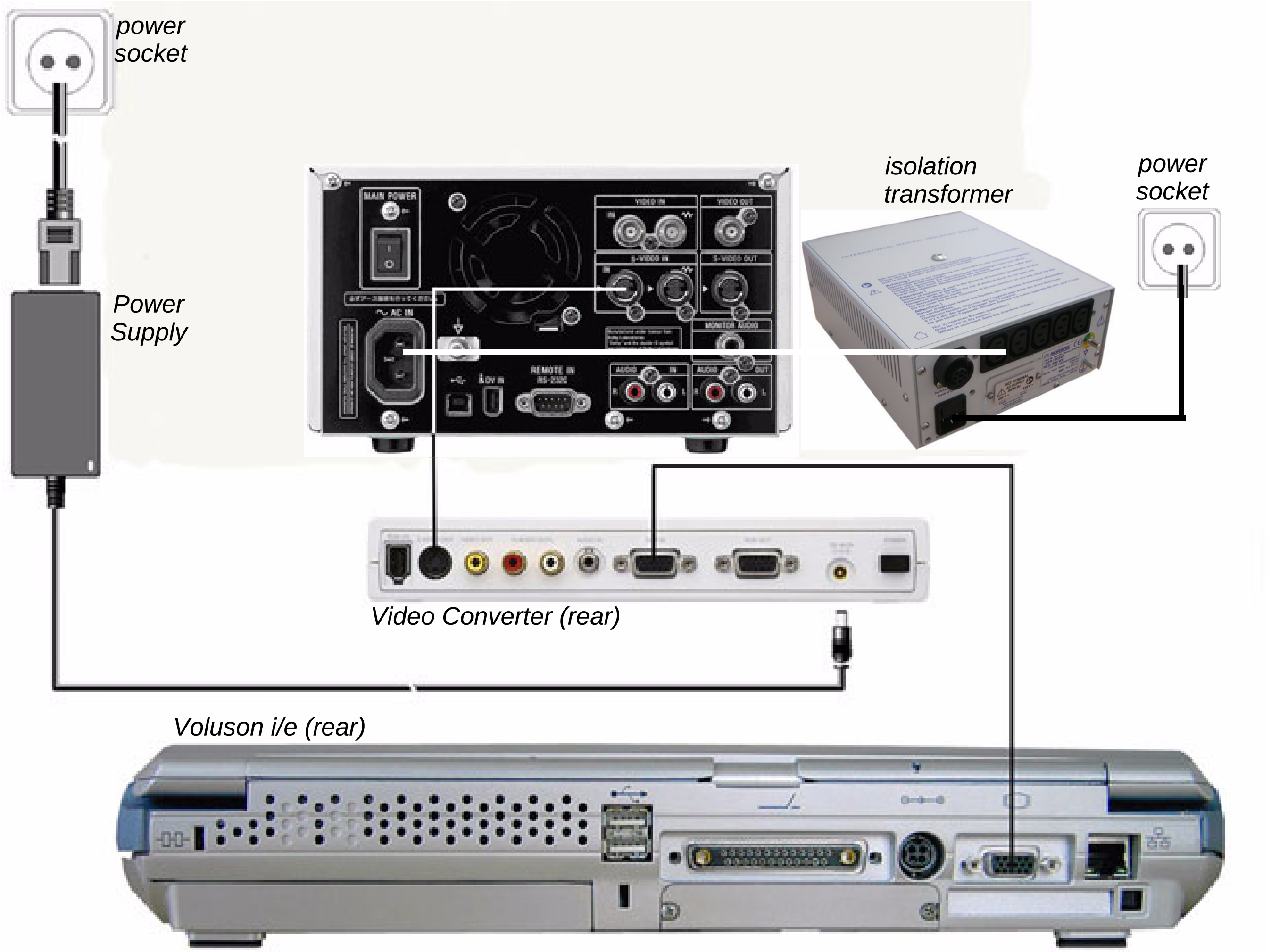

power socket
Power Supply
isolation transformer
power socket
Video Converter (rear)
Voluson i/e (rear)

Figure 3-74 Connection Scheme - DVD Recorder with Video Scan Converter Canopus

3-5-14-1 Direct Connection to the Voluson i / Voluson e system (cont'd)

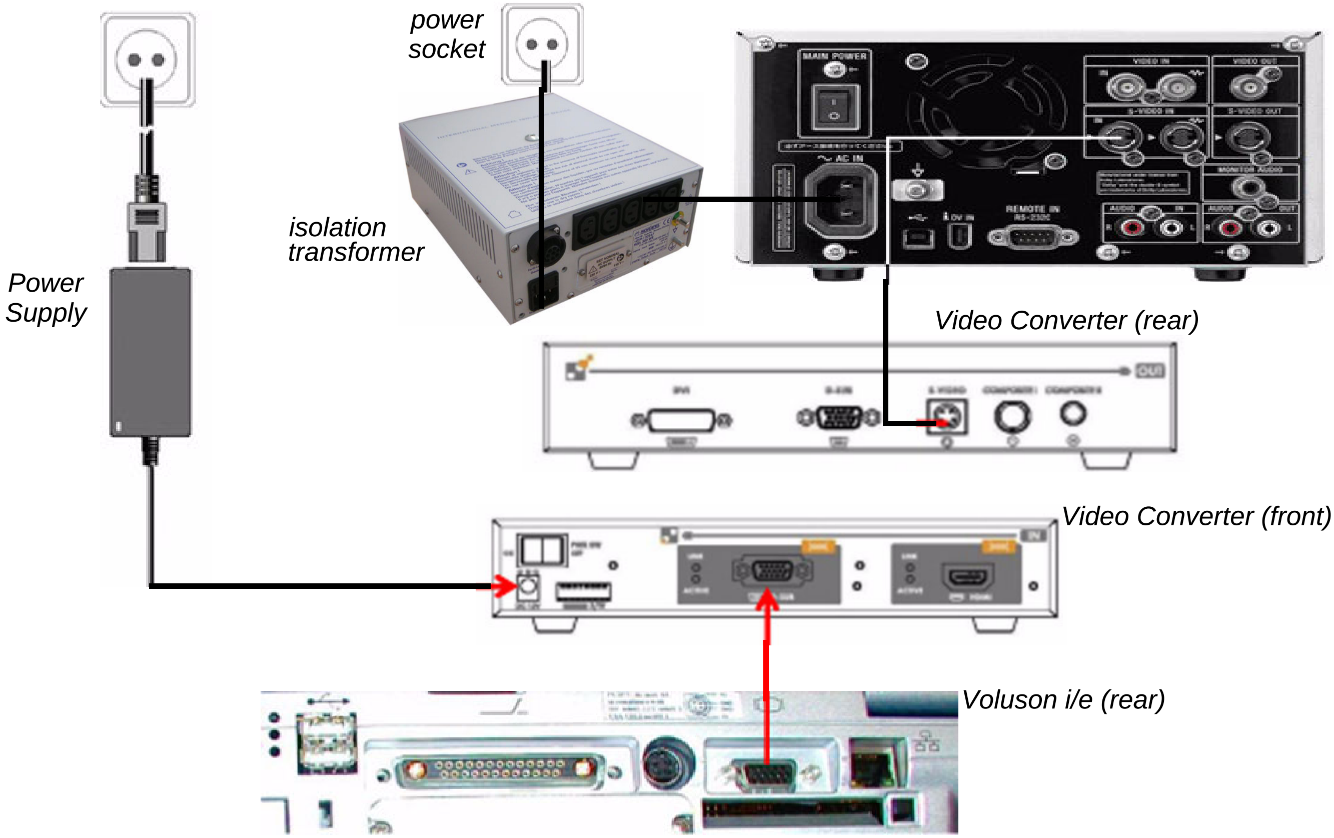


Figure 3-75 Connection Scheme - DVD Recorder with Video Scan Converter Ophit

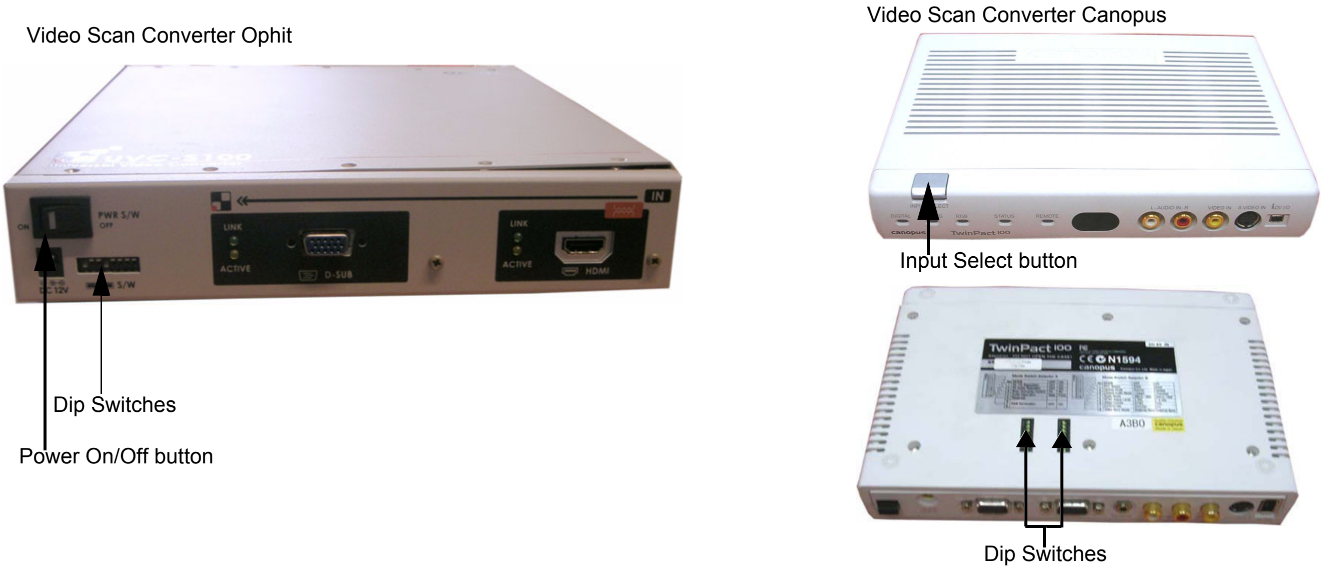
⚠ **CAUTION** When connecting the DVD Recorder/Video Converter directly to the system, it is necessary to use an additional power source. **As a safety requirement, the DVD Recorder internal AC/DC and the Video Converter AC/DC (supplied with the Video Converter) must be medical grade (conforming 60601-1 standard) or the safety must be ensured by the use of a medical grade isolation transformer.**

⚠ **NOTICE** Auxiliary equipment with direct mains connection requires galvanic separation e.g. by use of a medical grade isolation transformer.

1.) Connect one end of the VGA cable to SVGA OUT located on the Voluson i / Voluson e rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter (rear).
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the DVD recorder.

3-5-14-1 Direct Connection to the Voluson i / Voluson e system (cont'd)

NOTE: *Dip switches are located beneath the video converter, as shown in Figure 3-76 below.*

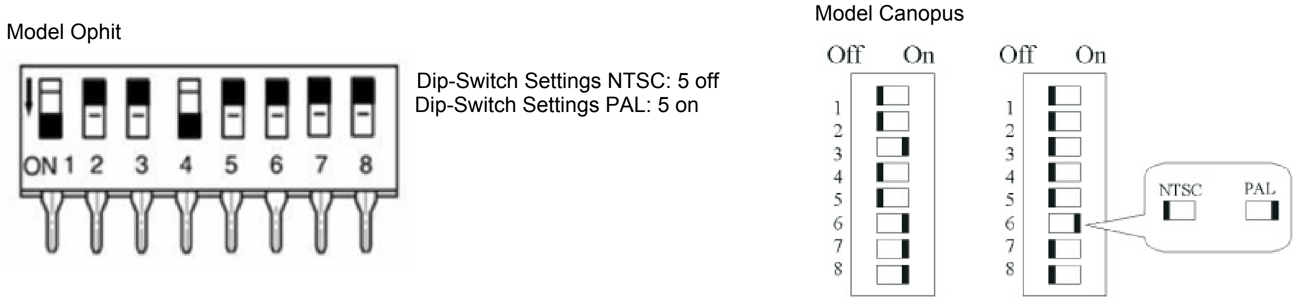


Video Scan Converter Ophit

Video Scan Converter Canopus

Figure 3-76 Video Converter Ophit (left image)/Video Converter Canopus (right image)

5.) If not already done, set the switches to the correct positions, as shown in Figure 3-77 below.



Model Ophit

Dip-Switch Settings NTSC: 5 off
Dip-Switch Settings PAL: 5 on

Model Canopus

Figure 3-77 Video Converter Dip Switch Positions

6.) When all power and signal cables are connected to the system, DVD recorder and video converter, proceed as follows (**in the order stated**):

- a.) Press the power ON switch on the DVD recorder.
- b.) Press the power ON switch on the Video converter.
- c.) Turn ON power to the Voluson i / Voluson e system.

7.) Press the **Input Select** button (see Figure 3-76 on page 3-62) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.

8.) Adjust the DVD Recorder settings as described in Section 3-5-14-5 on page 3-65.

NOTE: *If the VGA cable is disconnected/reconnected while the system is ON, the VGA output is maintained.*

NOTE: *If system is shut-down to standby or Full-shut-down while the VGA device is connected continuously, the VGA output will appear after the system is turned ON.*

NOTE: *If the system is shut-down to Standby or Full-shut-down and the VGA device is disconnected, the VGA output will not appear after power is turned ON, and the above procedure will have to be repeated.*

3-5-14-2 Voluson i / Voluson e mounted on Modo Cart

NOTE: For instructions see: Section 3-5-1-3 "Mounting large Peripherals (e.g., Color Printer)" on page 3-28.

The DVD recorder must be powered from the Modo Cart itself, via one of the isolated peripheral power cables provided on the Modo Cart. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Modo Cart.

1.) Connect one end of the VGA cable to SVGA OUT located on the Voluson i / Voluson e rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter (rear).
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the DVD recorder.

NOTE: Dip switches are located beneath the video converter, as shown in Figure 3-77 on page 3-62.

5.) Set the switches to the correct positions, as shown in Figure 3-77 on page 3-62.
6.) When all power and signal cables are connected to the system, DVD recorder and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the DVD recorder.
    b.) Press the power ON switch on the Video converter.
    c.) Turn ON power to the Voluson i / Voluson e system.
7.) Press the **Input Select** button (see: Figure 3-77 on page 3-62) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.
8.) Adjust the DVD Recorder settings as described in Section 3-5-14-5 on page 3-65.

3-5-14-3 Voluson i / Voluson e mounted on Dock Cart

NOTE: For instructions see: Section 3-5-2-6 "Mounting large Peripherals (e.g., Color Printer)" on page 3-34.

The DVD recorder must be powered from the Dock Cart itself, via one of the isolated peripheral power cables provided on the Dock Cart. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Dock Cart.

1.) Connect one end of the VGA cable to SVGA OUT located on the rear connector panel.
2.) Connect the other end of the VGA cable to RGB IN on the video converter (rear).
3.) Connect one end of the S-Video cable to S-VIDEO OUT on the video converter.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the DVD recorder.

NOTE: Dip switches are located beneath the video converter, as shown in Figure 3-77 on page 3-62.

5.) Set the switches to the correct positions, as shown in Figure 3-77 on page 3-62.
6.) When all power and signal cables are connected to the system, DVD recorder and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the DVD recorder.
    b.) Press the power ON switch on the Video converter.
    c.) Turn ON power to the Voluson i / Voluson e system.
7.) Press the **Input Select** button (see: Figure 3-77 on page 3-62) on the video converter ***three*** times in order to select RGB Input as your signal source.
The LED located on the video converter front panel will be illuminated, accordingly.
8.) Adjust the DVD Recorder settings as described in Section 3-5-14-5 on page 3-65.

3-5-14-4 Voluson i / Voluson e mounted on Voluson Station

NOTE: For instructions see: Section 3-5-3-9 "Mounting large Peripherals (e.g., VCR)" on page 3-42.

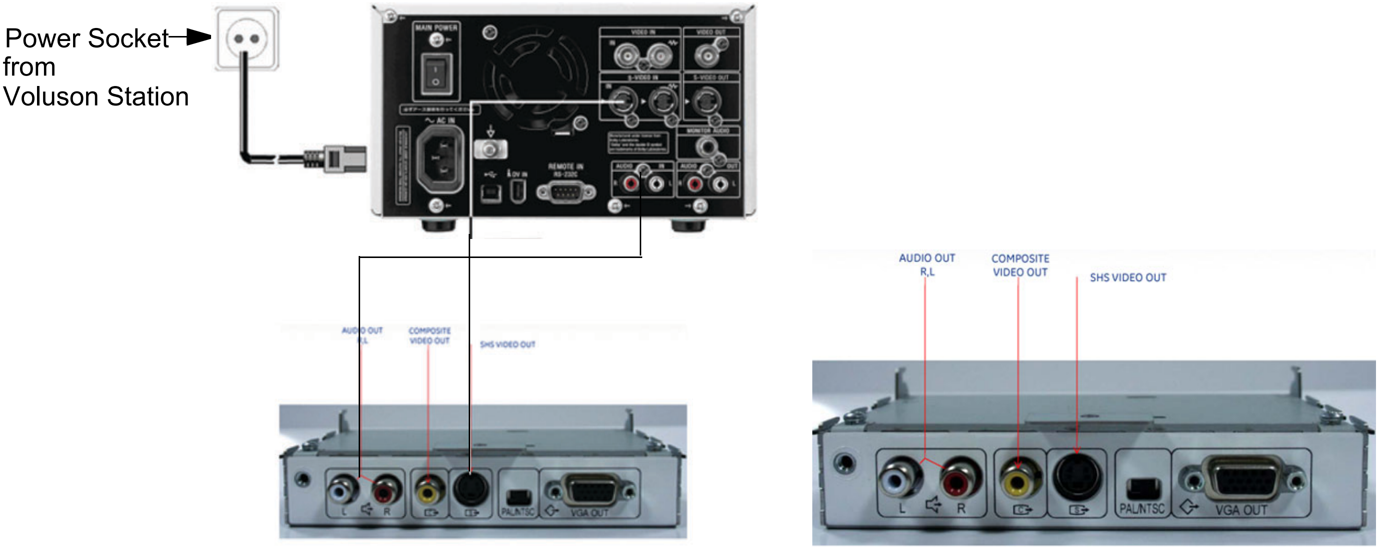


Figure 3-78 Connection Scheme

The DVD recorder must be powered from the Voluson Station itself, via one of the isolated peripheral power cables provided on the Voluson Station. The video signal is received through a VGA-to-video converter, and this must also be powered through one of the peripheral power outlets available on the Voluson Station.

1.) Connect one end of the Audio-cable to AUDIO OUT located on the Image Resizer of the Voluson Station.
2.) Connect the other end of the Audio-cable to AUDIO IN at the rear of the DVD recorder.
3.) Connect one end of the S-Video cable to S-VIDEO OUT located on the Image Resizer of the Voluson Station.
4.) Connect the other end of the S-Video cable to S-VIDEO IN at the rear of the DVD recorder.
5.) If not already done, set the switch to the correct positions (PAL or NTSC).
6.) When all power and signal cables are connected to the system, DVD recorder, and video converter, proceed as follows (**in the order stated**):
    a.) Press the power ON switch on the DVD.
    b.) Turn ON power to the Voluson i / Voluson e system.
    c.) Press the Circuit breaker on the Voluson Station.

Adjust the DVD Recorder settings as described in Section 3-5-14-5 on page 3-65.

NOTE: Please make sure, that the VGA Port is enabled.

3-5-14-5 Adjustment of the DVD Recorder Settings

3-5-14-5-1 Changing TV-System (Video format)

NOTE: To check Video format needed, see: Table 3-10, “TV-System and Region Code,” on page 3-67.

1.) If not already done, switch on the Sony DVO-1000MD DVD recorder.
2.) Press the **MENU** button **(A)** located on the front of the DVD recorder, see Figure 3-79 below.

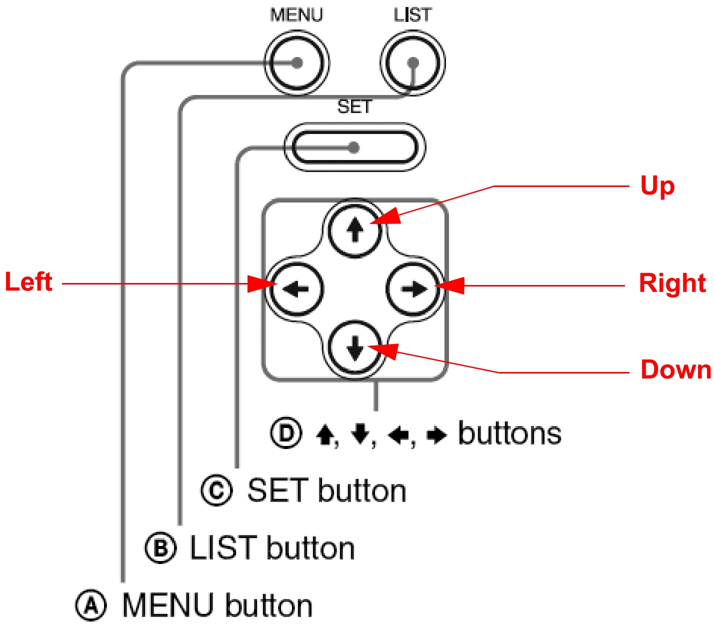

MENU
LIST
SET
Up
Left
Right
Down
Ⓓ ↑, ↓, ←, → buttons
Ⓒ SET button
Ⓑ LIST button
Ⓐ MENU button

Figure 3-79 Keys on the front of the recorder

3.) The “Main Menu” appears on the LCD screen of the DVD recorder, see: Figure 3-80 below.

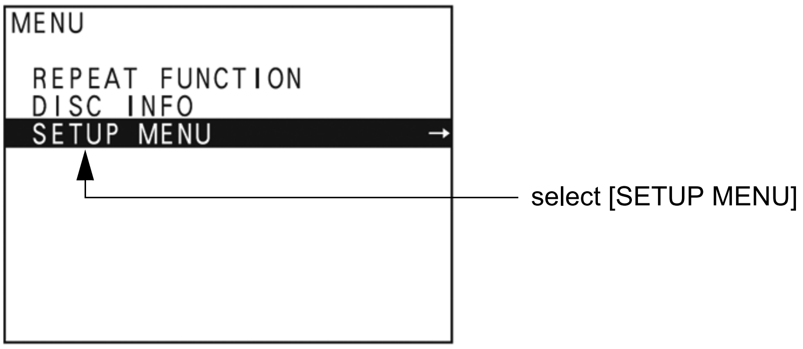

MENU
REPEAT FUNCTION
DISC INFO
SETUP MENU →
select [SETUP MENU]

Figure 3-80 “Main Menu” - [SETUP MENU] highlighted

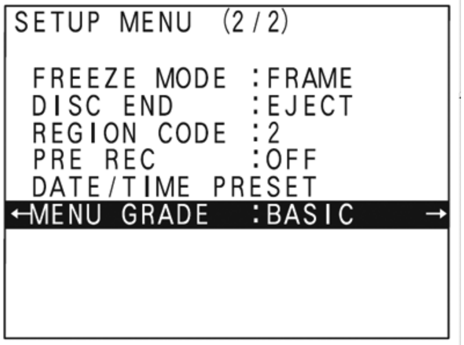
4.) Press the ↧ (down) button on the front of the recorder repeatedly until the [SETUP MENU] item is highlighted.

NOTE: Each time you press the ↥ (up) or ↧ (down) button, the highlight cursor moves up/down item by item.

5.) Press the → (right) button. The “Setup Menu” appears, see Figure 3-81 on page 3-66.

3-5-14-5 Adjustment of the DVD Recorder Settings (cont'd)

6.) Press the ↧ (down) button repeatedly, until [MENU GRADE] is highlighted.



```
SETUP MENU  (2/2)

 FREEZE MODE  :FRAME
 DISC END     :EJECT
 REGION CODE  :2
 PRE REC      :OFF
 DATE/TIME PRESET
←MENU GRADE   :BASIC      →
```

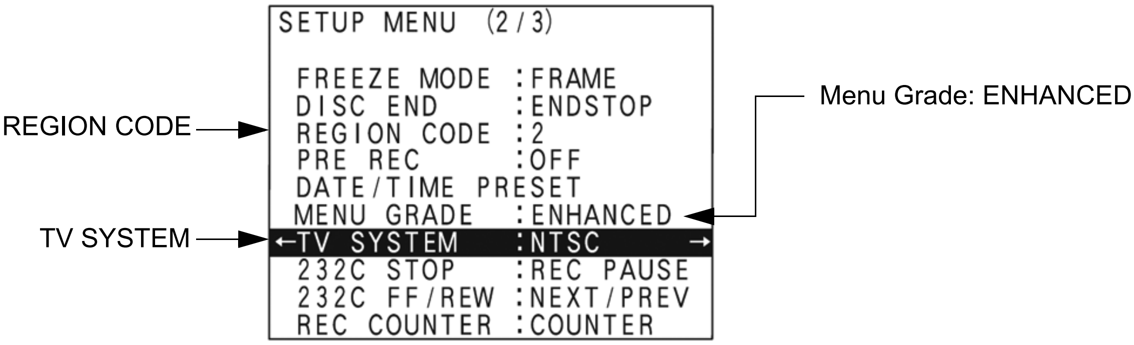
Figure 3-81 "Setup Menu" - [MENU GRADE] highlighted

7.) Press the → (right) button and select [ENHANCED].

8.) Press the ← (left) button, to exit the "Menu Grade" menu.

NOTE: Now additional items (see: Figure 3-82 below) are displayed in the "Setup Menu" .

9.) Select [TV SYSTEM] by pressing the ↧ (down) button.



```
SETUP MENU  (2/3)

 FREEZE MODE  :FRAME
 DISC END     :ENDSTOP
 REGION CODE  :2
 PRE REC      :OFF
 DATE/TIME PRESET
 MENU GRADE   :ENHANCED
←TV SYSTEM    :NTSC       →
 232C STOP    :REC PAUSE
 232C FF/REW  :NEXT/PREV
 REC COUNTER  :COUNTER
```

Figure 3-82 "Setup Menu" - [TV SYSTEM] highlighted

10.) Press the → (right) button. The "TV System" Sub menu appears.

11.) Select the appropriate video signal by pressing the ↥ (up) or ↧ (down) button respectively. To check the video signal, see: Table 3-10, "TV-System and Region Code," on page 3-67.

12.) Press the **SET** button **(C)**. The message *"Now loading..."* appears and the unit starts to save the settings.

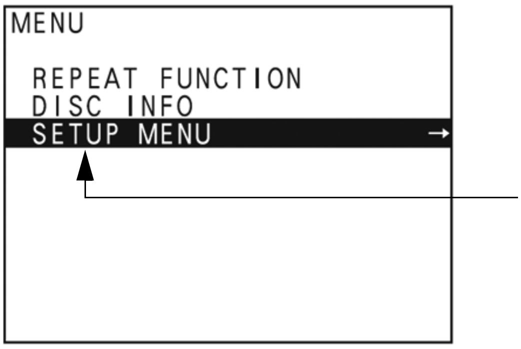
13.) When *"Power off"* appears on the display, press the **POWER** switch on the front of the DVD recorder to turn power off.

14.) Press the **POWER** switch again to turn power on.

3-5-14-5-2 Change the Region Code

NOTE: *To specify the correct region code, see: Table 3-10, “TV-System and Region Code,” on page 3-67.*

1.) If not already done, switch on the Sony DVO-1000MD DVD recorder.
2.) Press the **MENU** button **(A)** located on the front of the recorder, see Figure 3-79 on page 3-65.
3.) The “Main Menu” appears on the LCD screen of the DVD recorder, see: Figure 3-83 below.



select [SETUP MENU]

Figure 3-83 “Main Menu” - [SETUP MENU] highlighted

4.) Press the ↧ (down) button on the front of the recorder repeatedly until the [SETUP MENU] item is highlighted.
5.) Press the → (right) button. The “Setup Menu” appears, see Figure 3-81 on page 3-66.
6.) Press the ↧ (down) button repeatedly, until [REGION CODE] is highlighted.
7.) Press the → (right) button. The “Region Code Menu” appears.
8.) Select the appropriate region code by pressing the ↥ (up) or ↧ (down) button respectively.
To check the region code, see: Table 3-10, “TV-System and Region Code,” on page 3-67.
9.) Press the **SET** button **(C)**.
The message *“Now loading...”* appears and the unit starts to save the settings.
10.) When *“Power off”* appears on the display, press the **POWER** switch on the front of the DVD recorder to turn power off.
11.) Press the **POWER** switch again to turn power on.

Table 3-10 TV-System and Region Code

Country	Region Code	TV-System
USA and Canada	1	NTSC
Western Europe, Middle East, South Africa	2	PAL
Japan	2	NTSC
Southeast Asia, incl. Hong Kong	3	PAL/NTSC
Central and South America, Australia	4	PAL
Africa	5	NTSC
Eastern Europe, Russia, Central Asia incl. India	5	PAL
China	6	PAL

Section 3-6
Completing the Set Up

3-6-1 Connecting the Unit to a Power Source

The connection of the Voluson i / Voluson e ultrasound unit to a power source should be performed by a qualified person who has completed basic Voluson i / Voluson e System User Training. Use only the power cords, cables and plugs provided by or designated by GE to connect the unit to the power source.

⚠ **CAUTION** **Prior to connect the Voluson i / Voluson e unit to a power source, verify compliance with all electrical and safety requirements. Check the power cord to verify that it is intact and of hospital-grade. Products equipped with a power source (wall outlet) plug should be connected to the fixed power socket that has a protective grounding conductor. Never use an adapter or converter to connect with a power source plug (for example, a three-prong to two-prong converter).**

⚠ **WARNING** ***The unit's power must be supplied from a separate, properly rated outlet to avoid risk of fire. Refer to Section 2-2-2-1 "Voluson i / Voluson e Power Requirements" on page 2-2 for rating information. The power cord should not, under any circumstances, be altered to a configuration rated less than that specified for the current.***

⚠ **CAUTION** **Whenever disconnecting the Voluson i / Voluson e system from the electrical outlet, always observe the safety precautions. First unplug the main power cable from the wall outlet socket, then from the unit itself. Remove by pulling on the cable connector - DO NOT pull on the cable.**

⚠ **CAUTION** **The Voluson i / Voluson e requires all covers!**
Operate this system only when all board covers and frame panels are securely in place.
The covers are required for safe operation, good system performance and cooling purposes.

3-6-1-1 Voltage Level Checks

The following voltage level checks are required whenever the **Voluson i / Voluson e system is used with the** Modo Cart:

1.) Check the Fuses and Voltage Output Selector setting located on the isolation transformer of the Modo Cart. If required switch the output selector to correct position and exchange fuses of the isolation transformer, as described in Section 3-4-3 on page 3-20).

⚠ **CAUTION** **Before starting the Voluson i / Voluson e or peripherals that are connected to the Modo Cart, always make sure:**
• Rating of isolation transformer fuses is compatible. • Output Selector is in correct position.
The wrong fuses and position of the voltage output selector may cause major damage on Voluson i / Voluson e and connected peripherals.

2.) Verify the maximum power requirement.

⚠ **DANGER** **Failure to provide an adequate earth circuit (ground) may cause electrical shock and serious injury!**

3-6-1-1 Voltage Level Checks (cont'd)

The following voltage level checks are required whenever the **Voluson i / Voluson e system is used with the** Dock Cart **or the** Voluson Station:

1.) Check the Fuses and Voltage Output Selector setting located on the power supply of the Cart. If required switch the output selector to correct position and exchange fuses of the power supply, as described in Section 3-4-4 on page 3-21).

CAUTION **Before starting the Voluson i / Voluson e or peripherals that are connected to the Cart, always make sure:**
• Rating of power supply fuses is compatible. • Output Selector is in correct position.
The wrong fuses and position of the voltage output selector may cause major damage on Voluson i / Voluson e and connected peripherals.

2.) Verify the maximum power requirement.

DANGER **Failure to provide an adequate earth circuit (ground) may cause electrical shock and serious injury!**

3-6-2 Power On / Boot Up

NOTICE If the system is being used on the different Carts, please follow instructions as described in Section 3-5-1 "Connection and Usage of the optional Modo Cart" on page 3-25 or in Section 3-5-2 "Connection and Usage of the optional Dock Cart" on page 3-29 or in Section 3-5-3 "Connection and Usage of the optional Voluson Station" on page 3-35.

1.) Plug a power cable from the destination set into the AC Adapter of the Voluson i / Voluson e.

2.) Plug the power cable to the Voluson i / Voluson e AC Adapter like shown in Figure 3-84 below.

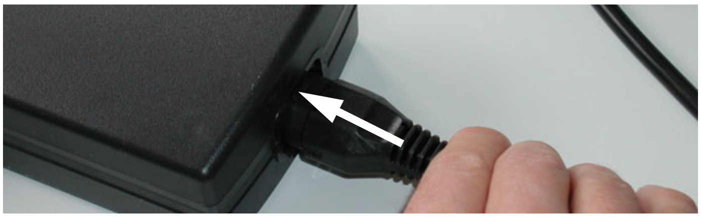


Figure 3-84 AC (main) Adapter connection

3.) Connect the L-shaped circular plug of the main power cable (via the AC Adapter) to the Power Inlet DC In connector on the rear of the Voluson i / Voluson e system (see: Figure 3-85).

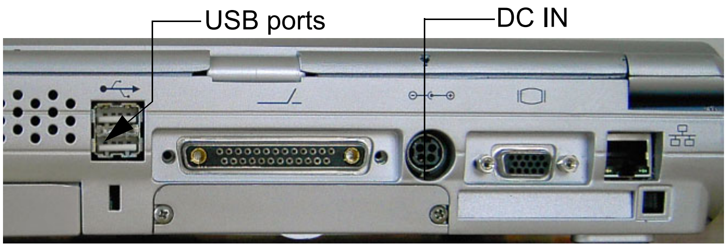


Figure 3-85 Main Power Connector (DC In) - Rear Panel

3-6-2 Power On / Boot Up (cont'd)

NOTE: *Through the protection plate near the plug, the power cable can only be plugged in one way.*

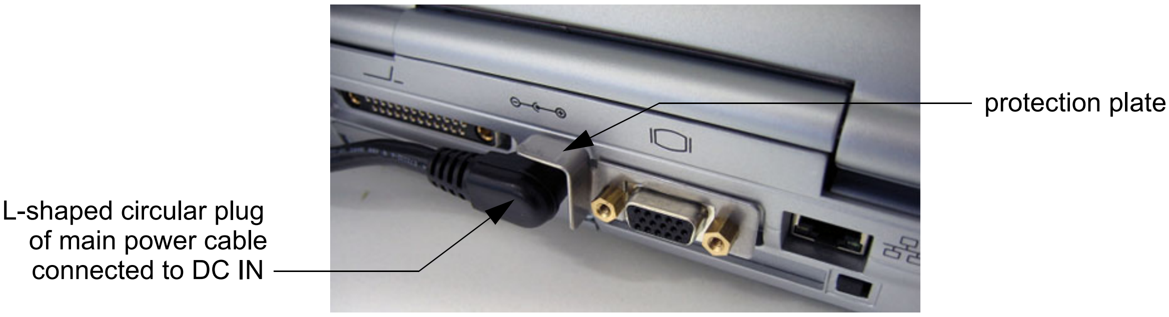


Figure 3-86 main power cable connected to Voluson i / Voluson e

4.) If not already done, connect peripheral devices such as DVD Drive, etc.
Links to connection schemes can be found in Table 3-9, "Connection Procedures," on page 3-23.

5.) Connect the other end of the main power cable to a hospital-grade main power outlet with the proper rated voltage.

⚠ **NOTICE** When AC power is applied to the scanner, the **On/Off** button on the control console illuminates amber, indicating that the System (including the Back-end Processor) is in *Standby* mode.

6.) Hold down the **On/Off** button (see: Figure 3-87) on the control panel for ~3 seconds.

The system automatically performs an initialization sequence which includes the following:

- Loading the operating system.
- Running a quick diagnostic check of the system.
- Detecting connected probe.

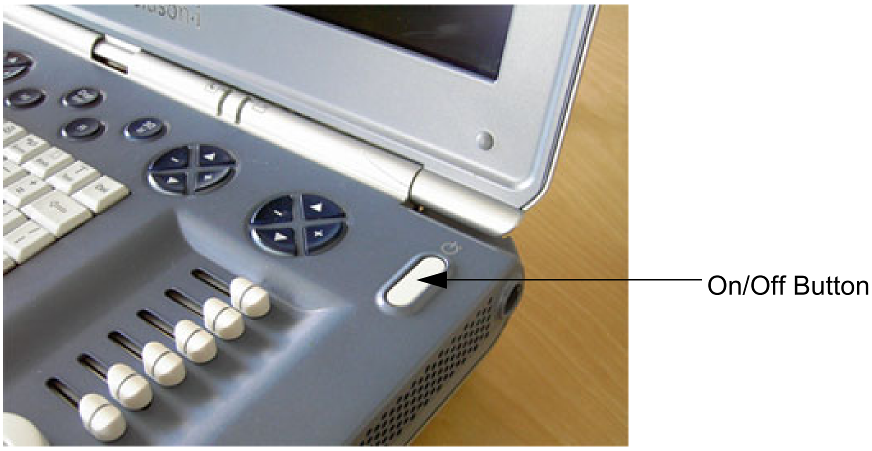


Figure 3-87 On/Off Button on Control Panel

As soon as the software has been loaded, the system enters 2D-Mode with the probe and application that were used before the system was shut down.

NOTE: *Total time used for start-up is typically one minute.*

NOTE: *When turning on the Voluson i / Voluson e from Standby mode, it takes a few seconds before it responds.*
Do not push the ON/OFF button again during this period. A second push will initiate a full shutdown.

3-6-2-1 During a normal boot, you may observe

A.) The ventilation fans starts on full speed, but slow down after a few seconds (listen to fan noise)

B.) Power is distributed to Peripherals, Operator Panel (control panel), Monitor, Front-End and Back-End Processor.

C.) The Back-End Processor and rest of the scanner starts with the sequence listed in following steps:

1.) The “Boot Screen” is displayed. (**Voluson** is highlighted, Figure 3-88 below).

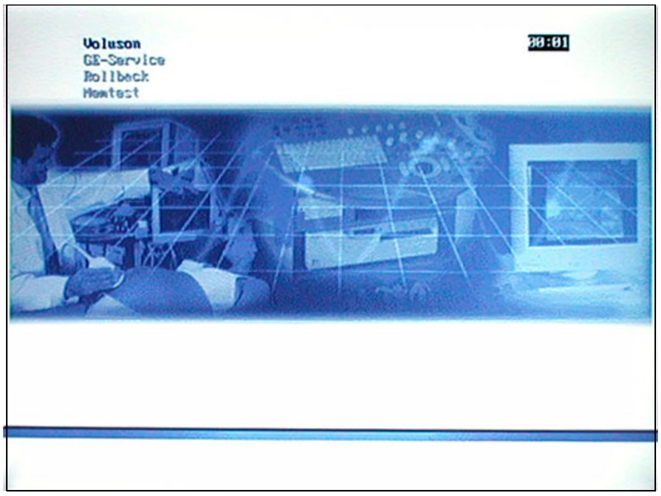
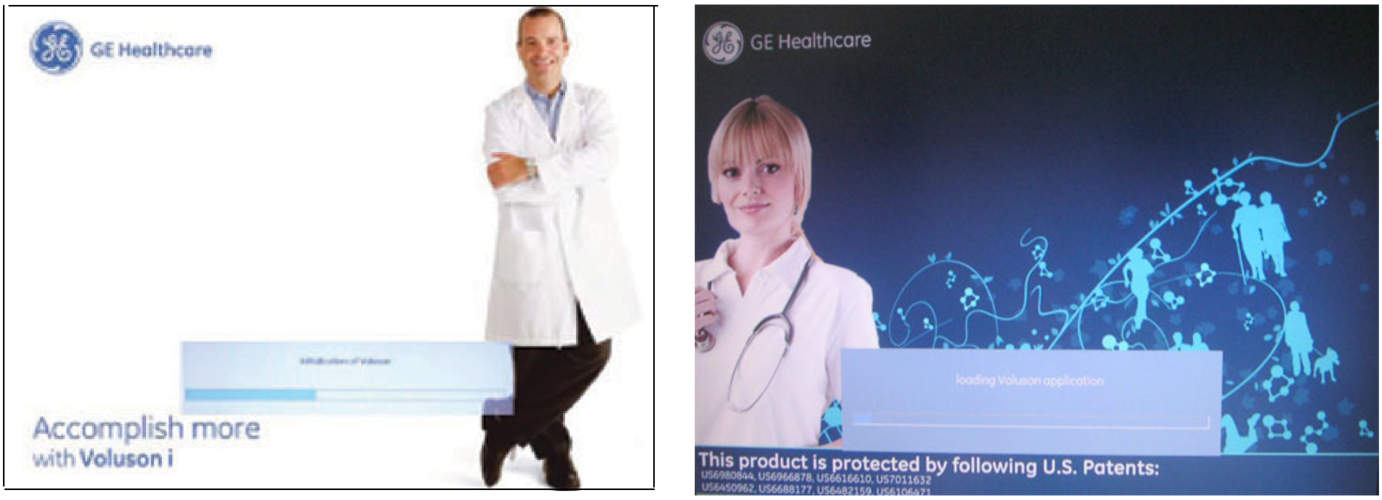


Figure 3-88 Boot screen

2.) Back-End Processor is turned ON and starts to load the software.

3.) The Start Screen (Voluson i) is displayed on the monitor.

4.) Start-up process bars indicating software loading procedures, are displayed on the monitor, as shown in Figure 3-89 below.



This product is protected by following U.S. Patents:
US6980844, US6966878, US6616610, US7011632
US6450962, US6688177, US6482159, US6106471

with Software 6.x.x and 7.x.x

with Software 8.x.x and higher

Figure 3-89 GE wallpaper with progress bar

5.) The software initiates and sets up the Front-End electronics and the rest of the scanner.

6.) The Keyboard backlight is lit.

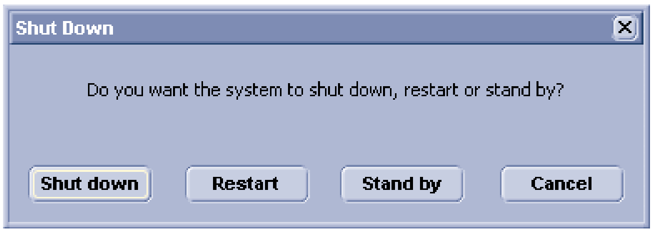
7.) As soon as the software has been loaded, the 2D screen is displayed on the monitor.

3-6-3 Power Off/ Shutdown

- **Standby Mode**

NOTE: *The Standby Mode on the Voluson i / Voluson e is available with Software 7.x.x. and higher.*

1.) If not already in read mode, freeze the image.
2.) Press the **On/Off** button (see: Figure 3-87) on the control panel. Following dialog appears.



Do you want the system to shut down, restart or stand by?

Figure 3-90 Shutdown, Restart or Standby

3.) Select the STANDBY button.
The system performs an automatic shutdown sequence and will remain in *Standby* mode.
4.) Leave the main power cable connected to keep the standby battery fully charged.

⚠ **NOTICE** The battery is automatically charged when the system is plugged into an active wall outlet.
It takes approximately 10 hours to charge a flat battery.

If the system is left in the OFF condition (system unplugged from the wall outlet) for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. If this occurs, the system needs to recharge the batteries. This may take 15 minutes to as long as 10 hours, depending on battery age, system input voltage and system temperature. To avoid draining the battery, the system should remain plugged into the wall outlet with the wall outlet power switch in ON position.

⚠ **NOTICE** After turning off a system, wait at least ten seconds before turning it on again.
The system may not be able to boot if power is recycled too quickly.

NOTE: *Once the lid of the Voluson i / Voluson e system is closed completely, Standby mode is activated.*

NOTE: *It is recommended to perform a complete system power down (see: • Full Shutdown) at least once a week.*

- **Full Shutdown**

1.) If not already in read mode, freeze the image.
2.) Press the **On/Off** button (refer to: Figure 3-87). A dialog window (see: Figure 3-90, above) appears.
3.) Select the SHUTDOWN button. The system performs an automatic full shutdown sequence.
4.) After complete power down, unplug the main power cable from the AC wall outlet socket.
5.) Unplug the main power cable connector from the AC input socket on the Voluson Station / Cart or the AC-DC converter of the system.

⚠ **NOTICE** If the system is still running when disconnecting the main power, the internal power supply will switch over to the battery power. The internal battery supplies the system with power until it is drained to 30% capacity (invoking shutdown), or shutdown has been invoked by the user.

⚠ **NOTICE** After turning off a system, wait at least ten seconds before turning it on again.
The system may not be able to boot if power is recycled too quickly.

NOTE: *Connect the power cable to the main power outlet again as soon as possible and at least before you switch on the main power and press the On/Off button.*

3-6-4 Internal Lithium Ion Battery

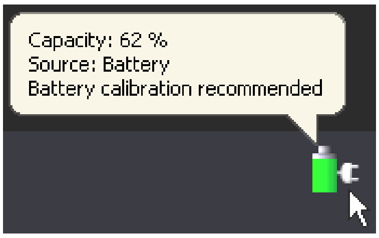
One battery is standard delivered with the Voluson i / Voluson e. This lithium ion battery provides power when an AC power source is not available. You can expect one hour of battery life with a fully charged battery.

When the system is running, a status icon is displayed in the system Status bar to indicate the current battery status.

Table 3-11 Battery Status

Icon	Status Description
🔌	**AC Power is on; no battery present**
🔋🔌	**AC Power is on; battery is full**
🔋!	**Battery in use; battery almost empty**
🔋	**Battery in use; fully charged**
🔋	**Battery in use; partly charged**
🔋🔌	**AC Power is on; battery is charging**

NOTE: To check capacity of the battery, move the cursor over the ***Battery Icon*** *in the status area.*



Capacity: 62 %
Source: Battery
Battery calibration recommended

Figure 3-91 Battery Capacity check

When shutting down the system, leave the main power cable connected to remain in standby and therefore battery fully charged.

⚠ **NOTICE** If the system is left in the OFF condition (system unplugged from the wall outlet) for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. If this occurs, the battery needs to be recharged by means of the internal or the external (optional) battery charger. Operation see: Section 3-6-4-1 "Charging the Battery" on page 3-74.

⚠ **CAUTION** **If the Voluson i / Voluson e portable ultrasound system is not being used on a monthly basis, the battery needs to be removed during lengthy non-use period.**

3-6-4 Internal Lithium Ion Battery (cont'd)

The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such a watch batteries).

CAUTION **Used batteries should not be placed with common household waste products. Contact local authorities for the location of a chemical waste collection program nearest you.**

NOTE: *Lithium ion batteries last longer than conventional batteries and do not require replacement as often.* ***Only*** *use the batteries designed to work with the Voluson i / Voluson e, and authorized by GE Medical Systems.*

CAUTION **To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:**

- Do **not** immerse the battery in water or allow it to get wet.
- Do **not** put the battery into a microwave oven or pressurized container.
  If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it.
- If you have any questions about the battery, consult GE or your local representative.

Storage of battery pack:

Short term (less than one month): 0° C (32°F) - 50° C (122°F)

Long term (more than three months): 10° C (50° F) - 35° C (95°F).

CAUTION **The battery has a safety device.**

- Do **not** disassemble or alter it. Charge the batteries only when the ambient temperature is between 0° and 65° C (32° and 149° F) and discharge the batteries between -10° and 55° C (14° and 131° F).
- Do **not** short-circuit the battery by directly connecting the battery terminals with metal objects.
- Do **not** heat the battery or discard it in a fire.
- Do **not** expose the battery to temperature over 60° C (140° F).
  Keep it away from fire and other heat sources.
- Do **not** charge the battery near a heat source, e.g. fire or heaters.
- Do **not** leave the battery in direct sunlight.
- Do **not** pierce the battery with a sharp object, hit it, or step on it.
- Do **not** use a damaged battery. Do not solder a battery.
- Do **not** connect the battery to an electrical outlet.

3-6-4-1 Charging the Battery

There are two possibilities to recharge the Voluson i / Voluson e´s lithium ion battery:

- by means of the Voluson i / Voluson e´s Internal Battery Charger
- by means of the optional External Battery Charger

3-6-4-1-1 Internal Battery Charger

The battery is automatically charged when the system is plugged into an active wall outlet.
It takes approximately 10 hours to completely charge a flat battery.

Recharging the battery could take 15 minutes to as long as 10 hours, depending on the battery age, system input voltage and system temperature.

NOTE: *To eliminate draining the batteries, the system should remain plugged into the wall outlet with the wall outlet power switch in the ON position.*

3-6-4-1-2 External Battery Charger

NOTE: *The CH5000 is a stand-alone desktop smart-battery charger with the added ability to recalibrate the fuel gauge when detected to be out of calibration. The charger is specifically designed to operate with the Voluson i / Voluson e smart-battery.*

CAUTION **Always observe the following SAFETY precautions:**

- Do not use in patient environment!
- Do not use in anesthetic and oxygen patient environment!
- Do not expose the charger or power supply to water or conductive liquids (this is not a sealed case).
- Do not open the charger or power supply case. There are no user-serviceable parts inside.
- Do not cover the fan exhaust or obstruct the airflow, as this will cause overheating.
- Use only the manufacturer’s power supply and observe terminal polarity.
- Place the charger in a cool location, away from external heat sources.
- **CAUTION:** During recalibration, the battery connector and base of the charger may become warm.

1.) Place the charger unit on a flat, level surface away from sources of heat and moisture.
2.) Plug the DC connector from the power supply into the back of the charger.

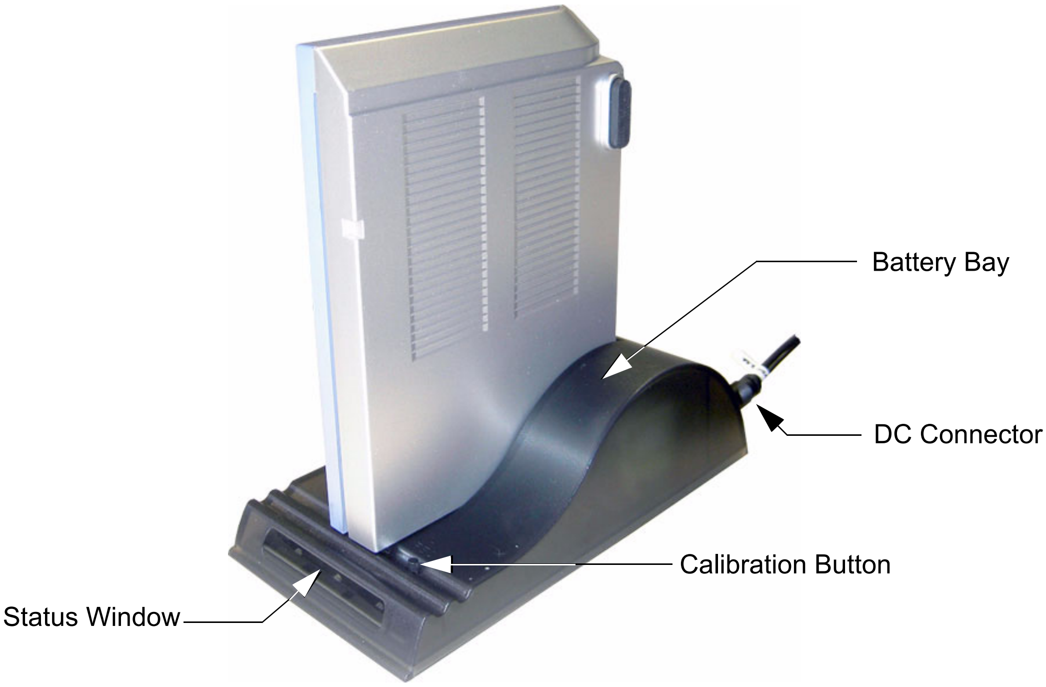


Figure 3-92 Battery Charger Unit

3.) Connect the power supply to the mains AC supply, using the cable supplied.
4.) Place the battery into the battery bay making sure that the connector is fully seated.

The LEDs in the status window (see Figure 3-92, above) provide status information as detailed in Table 3-11 on page 3-73, and the charger will automatically starts charging.

During the charging procedure, the green LED is flashing.
At the end of this procedure, when the battery is fully charged, the solid green LED is illuminated in the status window, indicating a fully charged battery.

Table 3-12   Battery Charger LED Indicators and Status

LED Indicator		Status
✳	Green Flashing	Battery charging
🟢	Green Solid	Battery fully charged
✳	Blue flashing	Battery in calibration mode
🔵	Blue Solid	Battery fuel gauge calibrated
✳	Red Flashing	Battery fuel gauge in need of recalibration
🔴	Red Solid	Error

- **Recharge Time**:
  Time for a full charge from 0% to 100% state of charge is typically 4.5 hours.
- **Recalibration Time**
  minimum recalibration time: approximately 9 hours
  maximum recalibration time: approximately 14 hours
  see: Section 3-6-4-2 "Recalibrating the Battery" on page 3-76.

Remove the battery from the charger unit battery bay and install it in the Voluson i / Voluson e system.

NOTE: For more details, refer to Section 5-5-6 "Battery Charger" on page 5-33.

3-6-4-2 Recalibrating the Battery

NOTICE Recalibration will take between **9 an 14 hours** (depending on state of charge of the battery).
In order to carry out a full recalibration the following must occur:
• a fully battery charge (to take it to 100% charged and establish current “Full point”)
• a fully calibration discharge (at this point the battery is calibrated, but also empty)
• a fully recharge to return it to use
A calibration cycle will be **faster if the battery is fully charged** to begin with.

There are two possibilities to recalibrate the Voluson i / Voluson e´s lithium ion battery:

- Recalibration by means of Internal Battery Charger
- Recalibration by means of External Battery Charger

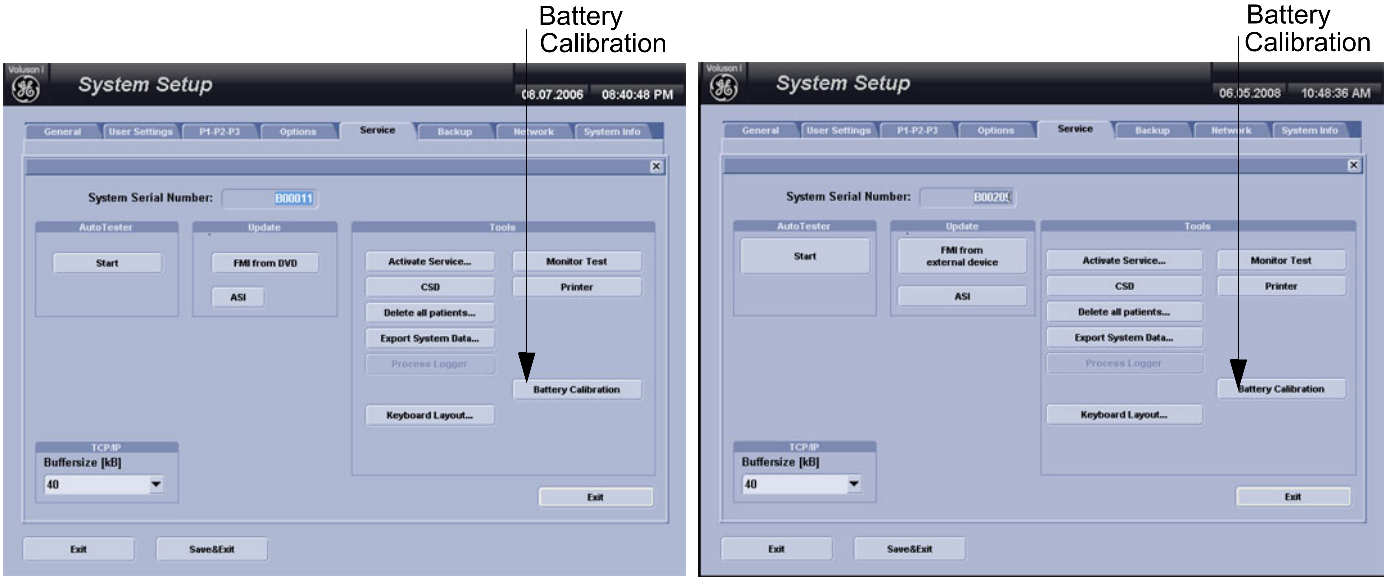
NOTE: For more details on recalibration and an explanation of why it is necessary, refer to Section 5-5-6-2 "Recalibration" on page 5-34.

3-6-4-2-1 Recalibration by means of Internal Battery Charger

1.) Press the **UTILITIES** key and select the SYSTEM from the menu area on the left side of the screen.

2.) Select the SERVICE page on the screen. The “password window” appears automatically.

3.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


Battery Calibration
Battery Calibration
System Setup
08.07.2006 08:40:48 PM
06.05.2008 10:48:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
AutoTester
Start
Update
FMI from DVD
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
40
Exit
Save&Exit

System Serial Number: B00011

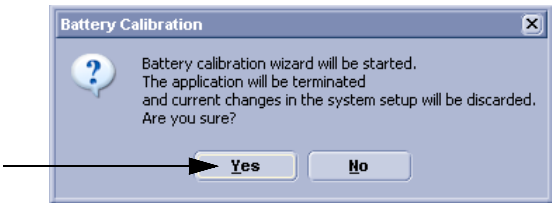
with Software 6.x.x and 7.x.x

with Software 8.x.x

Figure 3-93 Service Tools window

4.) Click on the BATTERY CALIBRATION button.

5.) Confirm the following dialog with YES.


Battery Calibration
Yes
No

Battery calibration wizard will be started.
The application will be terminated
and current changes in the system setup will be discarded.
Are you sure?

Figure 3-94 Confirm with YES

6.) Follow the steps as described in the “Battery Calibration wizard” until Recalibration is finished.

3-6-4-2-2 Recalibration by means of External Battery Charger

NOTE: The LEDs in the Chargers status window will provide status information as detailed in Table 3-11 on page 3-73.

If the battery is in need of “fuel gauge” recalibration, the red LED will flash upon insertion of the battery into the battery bay. This indicator provides feedback to the user on the accuracy of the fuel gauge and avoids unnecessary battery calibration cycles.

The user has the option to calibrate the fuel gauge and charge the battery, or to only charge the battery. This option is given because a recalibration cycle is longer than a charge cycle.

NOTE: Calibration is initiated each time the [Calibrate] button on the external battery charger unit (see Figure 3-92 on page 3-75) is pressed. So it is not recommended to press the recalibration button part way through the recalibration cycle.

1) To recalibrate the battery, press the [Calibrate] button on the front of the battery charger unit.

NOTE: No action is required if only a recharge is required, as the charger will automatically begin to charge the battery.

The blue calibration LED will flash to indicate that the battery is undergoing the recalibration cycle.

There may be a short delay before the calibration begins. During calibration the discharge resistors will heat up and the fan will operate to maintain temperature within acceptable limits.

At the end of this procedure, when the battery is fully charged and the battery fuel gauge is calibrated, the solid green and blue LEDs will be illuminated in the status window, indicating a fully charged, fully calibrated battery.

2.) Remove the battery from the charger unit battery bay and install it in the Voluson i / Voluson e portable ultrasound system.

NOTE: The most common cause of calibration failure is overheating of the pack during discharge. For this reason, keep the charger away from direct sunlight or heat sources.

3-6-5 Transducer Connection

When the probe is connected, it is automatically activated.
Once connected, the probes can be selected for different applications.

1.) Inspect the probe and probe socket to verify that it is free of debris.

2.) Press the probe connector locking lever *downwards.* Afterwards align the connector with the probe port and carefully push it into place, as shown in *Figure 3-95 below.*

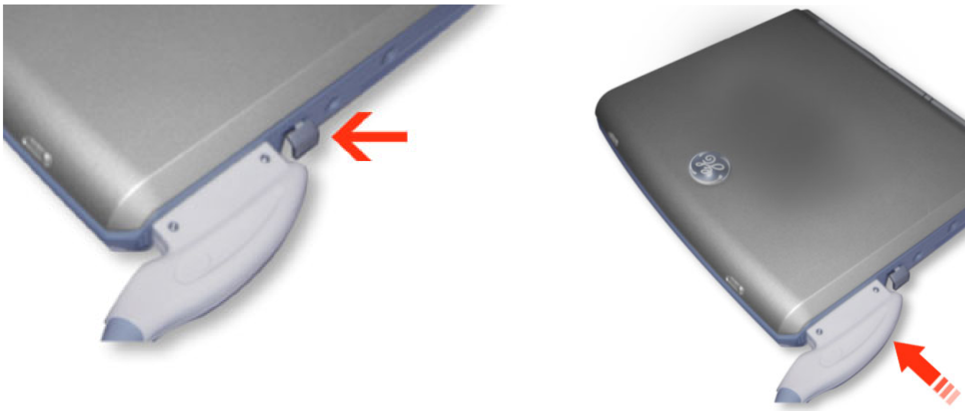


Figure 3-95 Connecting Probe to the Voluson i / Voluson e

3) Press the connector locking lever *upwards* to the full vertical position to lock in place.

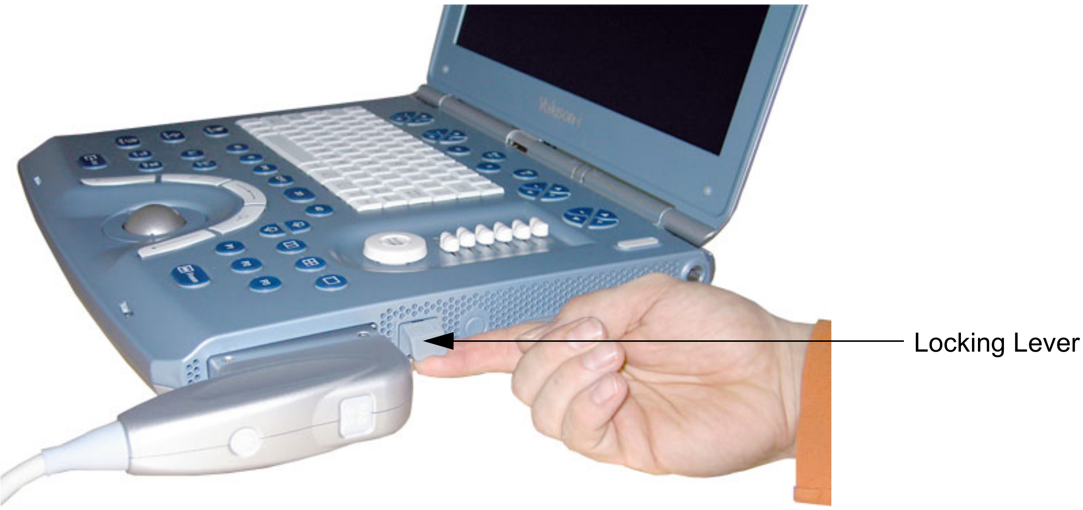


Figure 3-96 Securing probe with Locking Lever

4.) Carefully position the probe cord so that it is free to move and is not resting on the floor.

⚠ **CAUTION** **Do not** bend the probe cable acutely. **Fault conditions can result in electric shock hazard.**
Do not touch the surface of probe connectors which are exposed when the probe is removed.
Do not touch the patient when connecting or disconnecting a probe.

NOTE: For Connecting a probe to the Dock Cart please refer to 3.) on page 29.
For Connecting a probe to the Voluson Station please refer to 3.) on page 36.

NOTE: Prior to connecting or disconnecting a probe, freeze the image.
It is not necessary to turn OFF power to connect or disconnect a transducer.

Section 3-7
Printer Installation

NOTE: For Connection schemes refer to Section 3-5 "Connection of Auxiliary Devices" on page 3-23.

For further installation instructions see:

- Section 3-7-1 "Installing Digital Black & White Printer Sony UP-D897" on page 3-81
- Section 3-7-2 "Installing Digital Color Printer Sony UP-D23MD or UP-D25MD" on page 3-83.
- Section 3-7-3 "Installing Mitsubishi B&W Printer P95 and Color Printer CP30" on page 3-85
- Section 3-7-4 "Printer Installation manually" on page 3-87.
- Section 3-7-5 "Adjustment of Printer Settings" on page 3-91.

⚠ **CAUTION** **The Bluetooth Printer Connection set as well as the Color Deskjet printer MUST NOT be installed by the user! For installation please contact your local distributor or GE service representative.**

3-7-1 Installing Digital Black & White Printer Sony UP-D897

1.) Power off/Shutdown the system as described in: Section 3-6-3 on page 3-72.

2.) Connect the printer as described on page 3-51.

⚠ **NOTICE** Do not connect the USB-cable to the printer!

*NOTE: “Mouse functions” can be performed by using the trackball for moving the cursor.
“Normal select” (Click) = left/right trackball key ; “Opening a context menu” = upper trackball key*

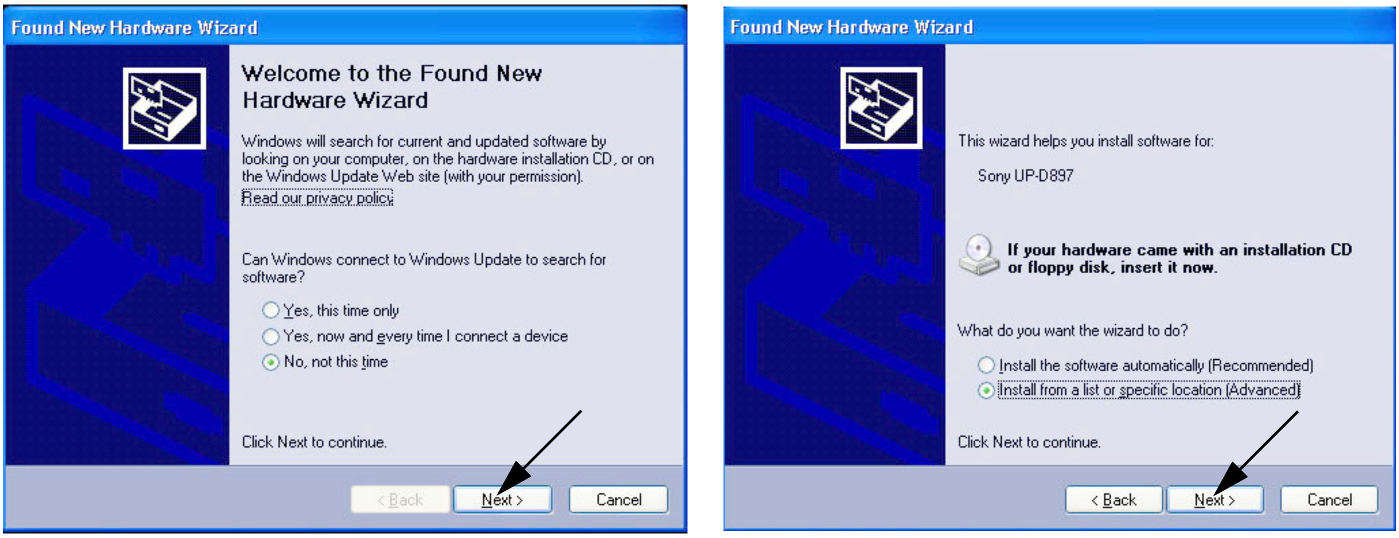
3.) Turn ON the printer, then switch ON the power of the system and wait till the system has booted.

NOTE: The power switch of the printer has to be in ON position before starting the system!

3-7-1-1 Install the UP-D897 printer software/driver

Perform the following steps if this printer was never installed on the Voluson i / Voluson e!

1.) Connect the USB cable to the printer and the system. The windows ‘Searching for Drivers …’, ‘Found new Hardware …’ and finally the following windows appear.


Found New Hardware Wizard

Welcome to the Found New Hardware Wizard

Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).

Read our privacy policy

Can Windows connect to Windows Update to search for software?

○ Yes, this time only
○ Yes, now and every time I connect a device
● No, not this time

Click Next to continue.

< Back | Next > | Cancel

Found New Hardware Wizard

This wizard helps you install software for:

Sony UP-D897

If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

○ Install the software automatically (Recommended)
● Install from a list or specific location (Advanced)

Click Next to continue.

< Back | Next > | Cancel

Figure 3-97 Found New Hardware Wizard

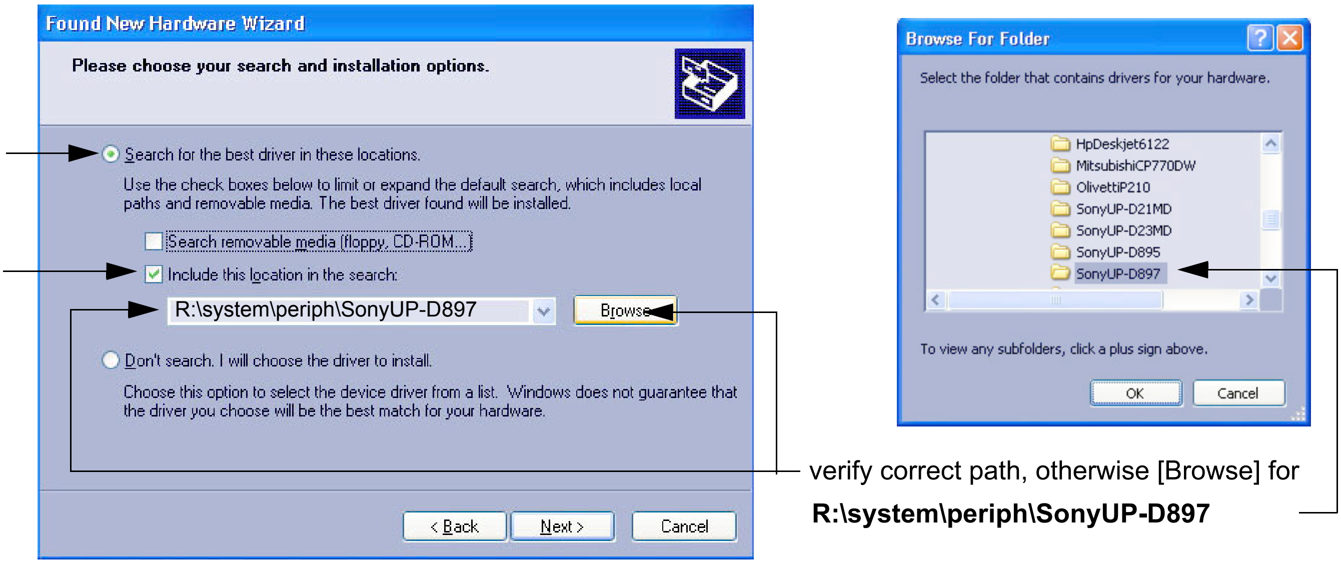
2.) Select “No, not this time” and verify with NEXT.

3.) In the next window, select “Install from a list or specific location!" and then click on NEXT.

4.) Select “Search for the best driver in these locations” and check mark “Include this location in the search” (see: Figure 3-98 on page 3-82).

3-7-1-1 **Install the UP-D897 printer software/driver** (cont'd)

NOTE: *If path (R:\system\....) is different from what is shown in Figure 3-98, click on the BROWSE button to search correct driver.*



Found New Hardware Wizard

Please choose your search and installation options.

● Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

R:\system\periph\SonyUP-D897

○ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

Browse For Folder

Select the folder that contains drivers for your hardware.

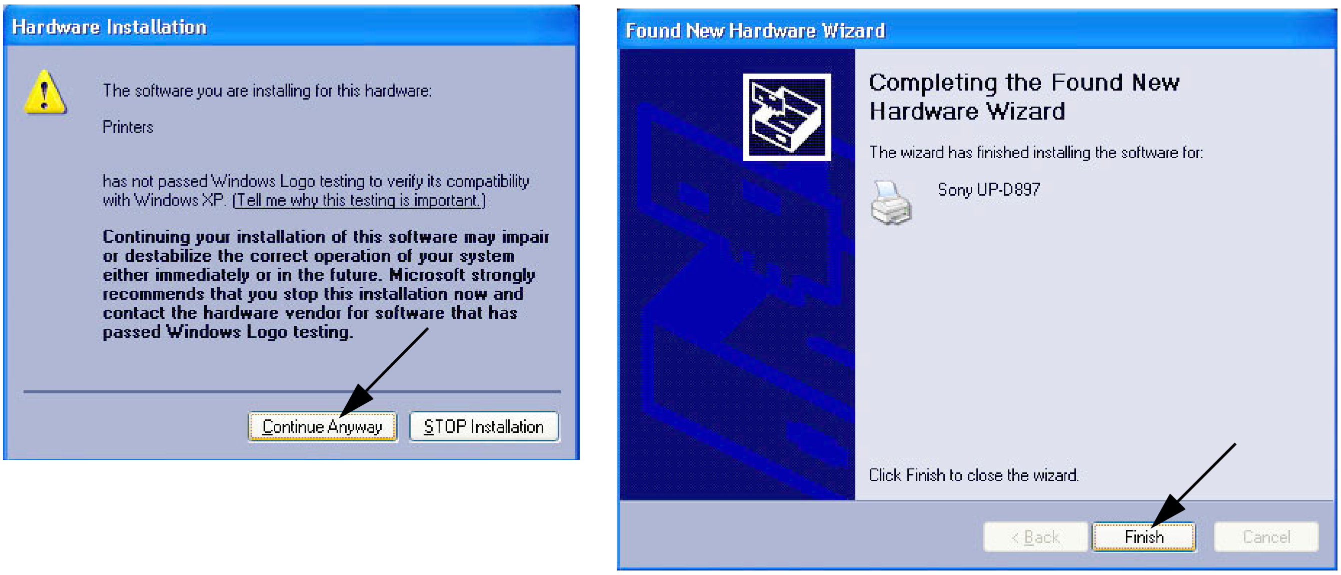
- HpDeskjet6122
- MitsubishiCP770DW
- OlivettiP210
- SonyUP-D21MD
- SonyUP-D23MD
- SonyUP-D895
- SonyUP-D897

To view any subfolders, click a plus sign above.

verify correct path, otherwise [Browse] for **R:\system\periph\SonyUP-D897**

Figure 3-98 Search for Network path

5.) Confirm the correct path and click NEXT to install the driver. All necessary files are copied.
6.) If the following Warning message appears, click CONTINUE ANYWAY.



Hardware Installation

The software you are installing for this hardware:

Printers

has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)

Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.

Found New Hardware Wizard

Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

Sony UP-D897

Click Finish to close the wizard.

Figure 3-99 Finish installation

7.) Confirm the installation by clicking FINISH to close the Hardware Wizard.
8.) Close all open windows and restart the system (turn off and on the system).

NOTICE After boot up of the system, verify the correct settings in the printer "Properties", see: Section 3-7-5 "Adjustment of Printer Settings" on page 3-91.

3-7-2 Installing Digital Color Printer Sony UP-D23MD or UP-D25MD

1.) Power off/Shutdown the system as described in: Section 3-6-3 on page 3-72.

2.) Connect the printer as described on page 3-52.

⚠ **NOTICE** Do not connect the USB-cable to the printer!

NOTE: *"Mouse functions" can be performed by using the trackball for moving the cursor.*
"Normal select" (Click) = left/right trackball key; "Opening a context menu" = upper trackball key

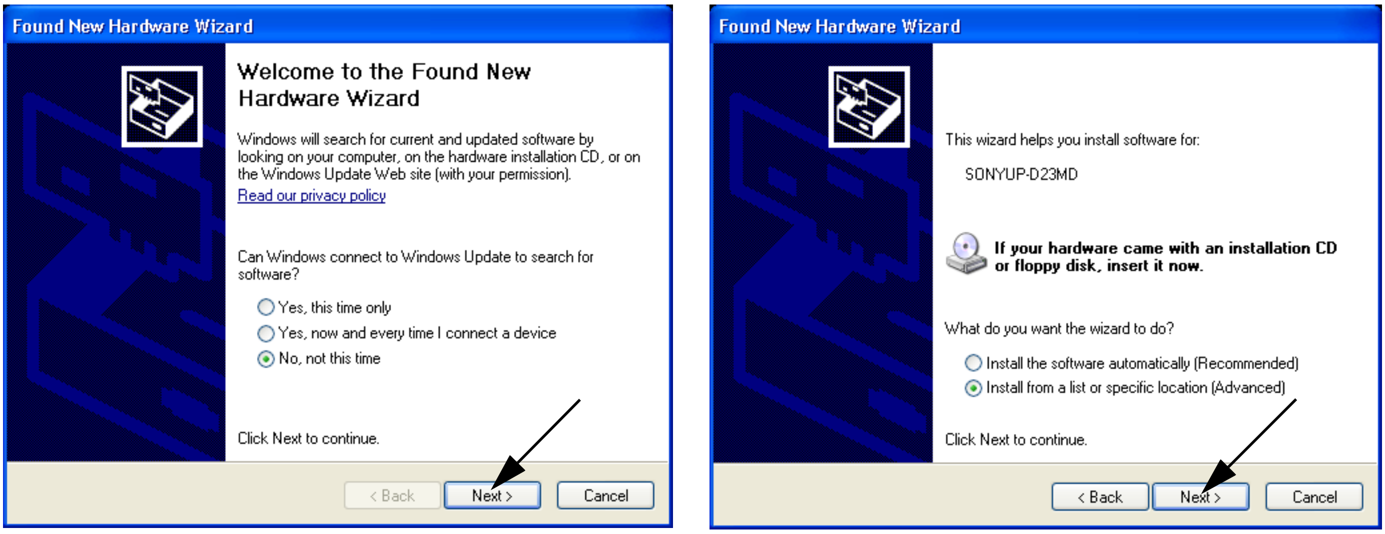
3.) Turn ON the printer, then switch ON the power of the system and wait till the system has booted.

NOTE: *The power switch of the printer has to be in ON position before starting the system!*

3-7-2-1 Install the UP-D23MD/UP-D25MD printer software/driver

Perform the following steps if this printer was never installed on the Voluson i / Voluson e!

1.) Connect the USB cable to the printer and the system. The windows 'Searching for Drivers …', 'Found new Hardware …' and finally the following windows appear.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Read our privacy policy
< Back
Next >
Cancel
Found New Hardware Wizard
< Back
Next >
Cancel

Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).

Can Windows connect to Windows Update to search for software?

○ Yes, this time only
○ Yes, now and every time I connect a device
● No, not this time

Click Next to continue.

This wizard helps you install software for:

SONYUP-D23MD

If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

○ Install the software automatically (Recommended)
● Install from a list or specific location (Advanced)

Click Next to continue.

Figure 3-100 Found New Hardware Wizard

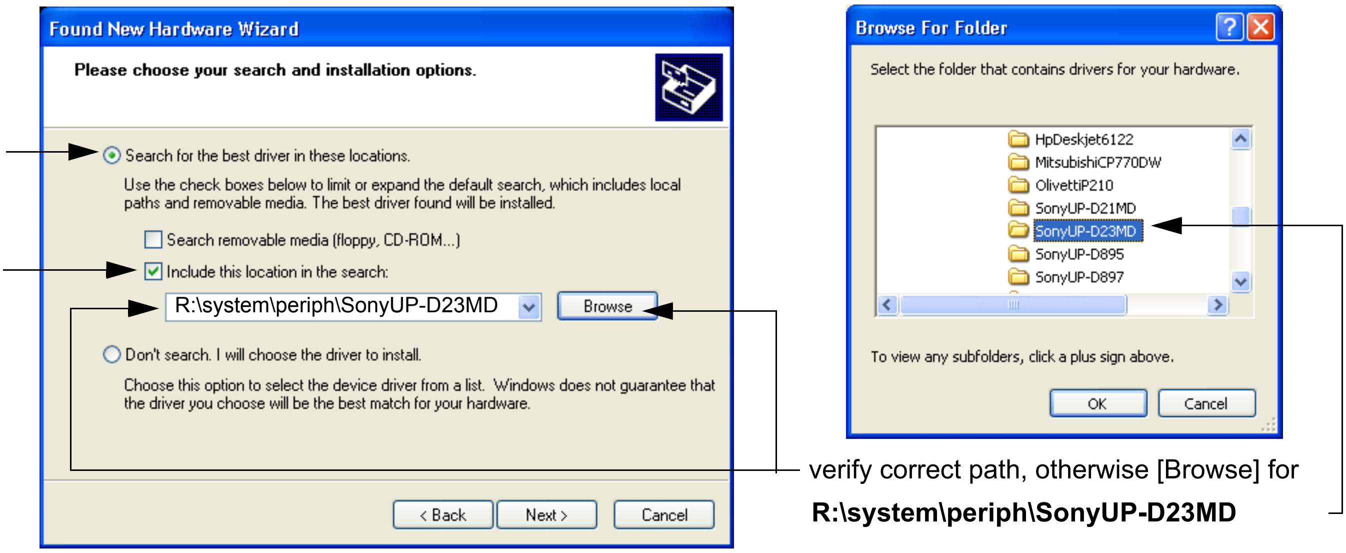
2.) Select "No, not this time" and verify with NEXT.

3.) In the next window, select "Install from a list or specific location!" and then click on NEXT.

4.) Select "Search for the best driver in these locations" and check mark "Include this location in the search" (see: Figure 3-101 on page 3-84).

3-7-2-1 Install the UP-D23MD/UP-D25MD printer software/driver (cont'd)

NOTE: *If path (R:\system\....) is different from what is shown in Figure 3-98, click on the BROWSE button to search correct driver.*



Found New Hardware Wizard

Please choose your search and installation options.

● Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

R:\system\periph\SonyUP-D23MD

○ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

Browse For Folder

Select the folder that contains drivers for your hardware.

- HpDeskjet6122
- MitsubishiCP770DW
- OlivettiP210
- SonyUP-D21MD
- SonyUP-D23MD
- SonyUP-D895
- SonyUP-D897

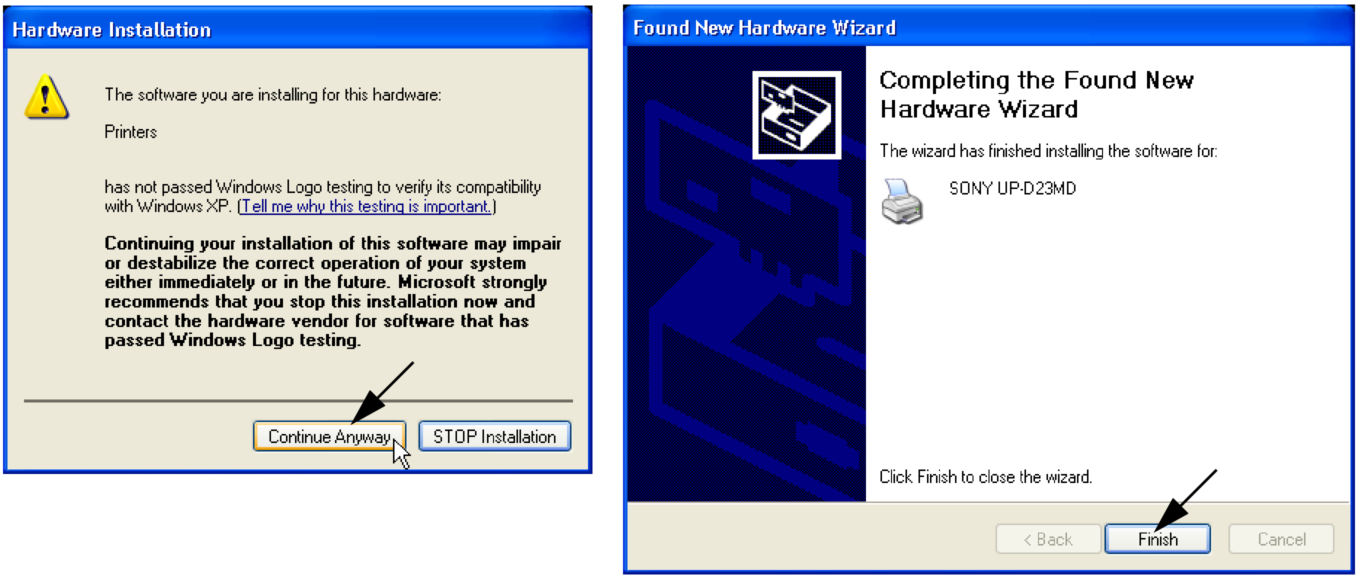
To view any subfolders, click a plus sign above.

verify correct path, otherwise [Browse] for **R:\system\periph\SonyUP-D23MD**

Figure 3-101 Search for Network path

5.) Confirm the correct path and click NEXT to install the driver. All necessary files are copied.

6.) If the following Warning message appears, click CONTINUE ANYWAY.



Hardware Installation

The software you are installing for this hardware:

Printers

has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)

Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.

Found New Hardware Wizard

Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

SONY UP-D23MD

Click Finish to close the wizard.

Figure 3-102 Finish installation

7.) Confirm the installation by clicking FINISH to close the Hardware Wizard.

8.) Close all open windows and restart the system (turn off and on the system).

⚠ **NOTICE** After boot up of the system, verify the correct settings in the printer "Properties", see: Section 3-7-5 "Adjustment of Printer Settings" on page 3-91.

3-7-3 Installing Mitsubishi B&W Printer P95 and Color Printer CP30

NOTE: *"Mouse functions" can be performed by using the trackball for moving the cursor.*
"Normal select" (Click) = left/right trackball key; "Opening a context menu" = upper trackball key

NOTE: *To use the Mitsubishi Printer with older Systems and Software versions a printer driver has to be installed. A printer driver disk is included with the new printer.*

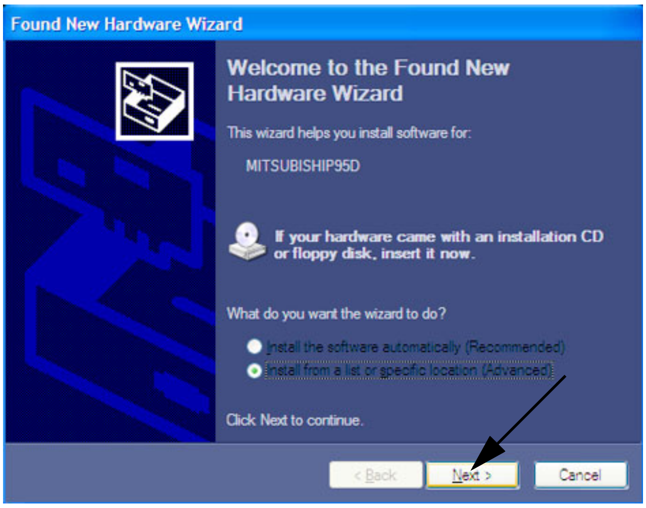
NOTE: *If you use the Printer, please always take the same USB port.*

NOTE: *If the same system software version (where Mitsubishi driver installation was performed) is re-installed by performing "Restore", "Initialize" and "New Disk" via LINUX, this printer will be found again as a new hardware device when connecting it to the system. The printer driver will have to be installed again via hardware wizard. Please be sure to leave the printer driver disk at the customer site with the other current software discs.*

NOTE: *Dip-Switch Settings for the Color Printer (KTZ302616); 1 and 2 ON; 3, 4, 5, 6, 7 and 8 OFF.*

NOTE: *If you use the B&W Printer (KTZ302617) you must first activate USB Serial number.*
1.) The Printer must be switched OFF.
2.) Press the "COPY" and "CONT" button together and switch ON the Printer.
When the display shows "S1" let off the both button.
3.) Press the "FUNC" button; the display shows "U0".
4.) Adjust to "U2" by using the turning knob.
5.) Press the "FUNC" button again and then switch OFF the Printer.

1.) Connect the printer to the system.
2.) Switch ON the power of the system and wait till the system has booted and then turn ON the printer.
3.) The "Found New Hardware Wizard" window appears.



Found New Hardware Wizard

Welcome to the Found New Hardware Wizard

This wizard helps you install software for:

MITSUBISHIP95D

If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

○ Install the software automatically (Recommended)
● Install from a list or specific location (Advanced)

Click Next to continue.

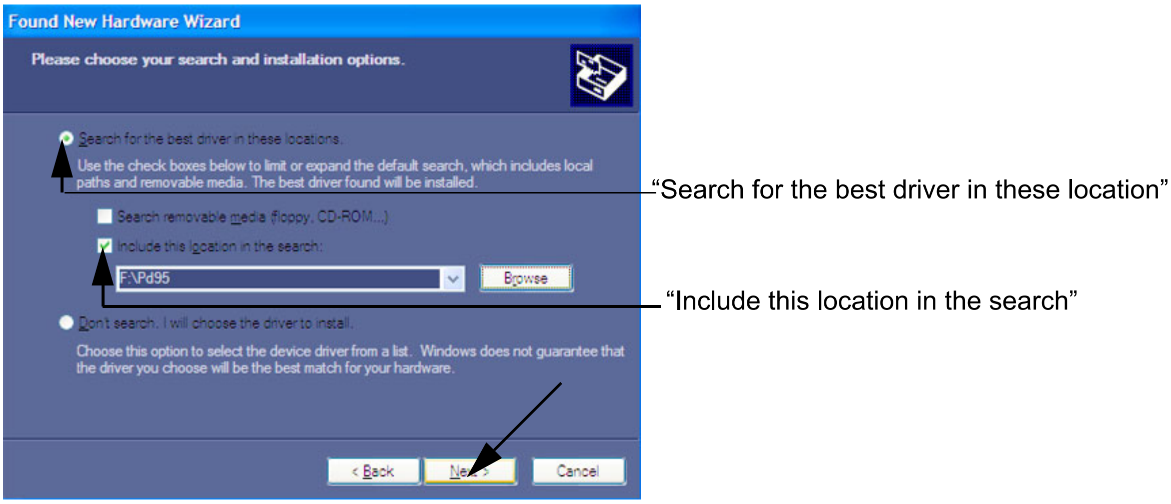
Figure 3-103 Found New Hardware Wizard / select "Install from ..."

4.) Select "**Install from a list or specific location**" and click on NEXT.

3-7-3 Installing Mitsubishi B&W Printer P95 and Color Printer CP30 (cont'd)

5.) In the next window select "**Search for the best driver in these locations**", select "**Include this location in the search:**" and browse for the right path. "R:\system\periph\Mitsubishi P95D" for the B&W Printer and "R:\system\periph\Win2000_XP" for the Color Printer or "C:\Utilities\PrinterDriver\Mitsubishi PD95" for the B&W Printer and "C:\Utilities\PrinterDriver\Win2000_XP" for the Color Printer. Path depeD95 or F:\Win2000_XP. (where F: stands for CD/DVD Drive) Then click on NEXT.

NOTE: If the "Printer Driver" Disk is defective or not available, download driver from GE folders http://libraries.ge.com/foldersIndex.do?entity_id=15869258101&sid=101&SF=1#15869248101 and extract files to CD or USB disk.



Please choose your search and installation options.

● Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☐ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

F:\Pd95

○ Don't search. I will choose the driver to install.

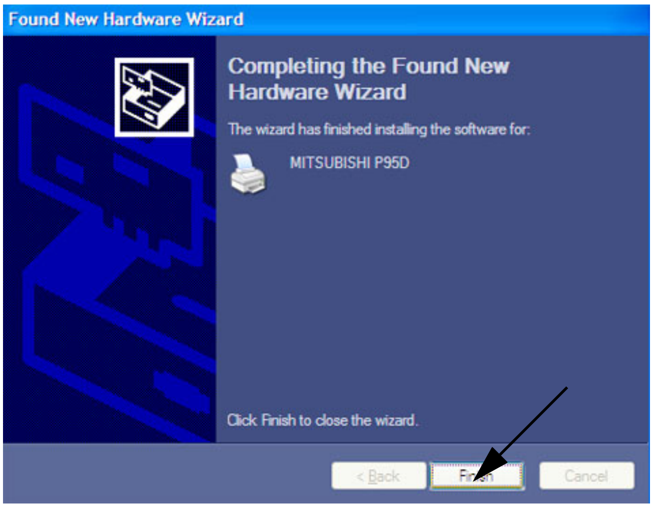
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

"Search for the best driver in these location"

"Include this location in the search"

Figure 3-104 select "Search for the ..." and "Include this location ..."

6.) Confirm the installation by clicking FINISH to close the Hardware Wizard.



Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

MITSUBISHI P95D

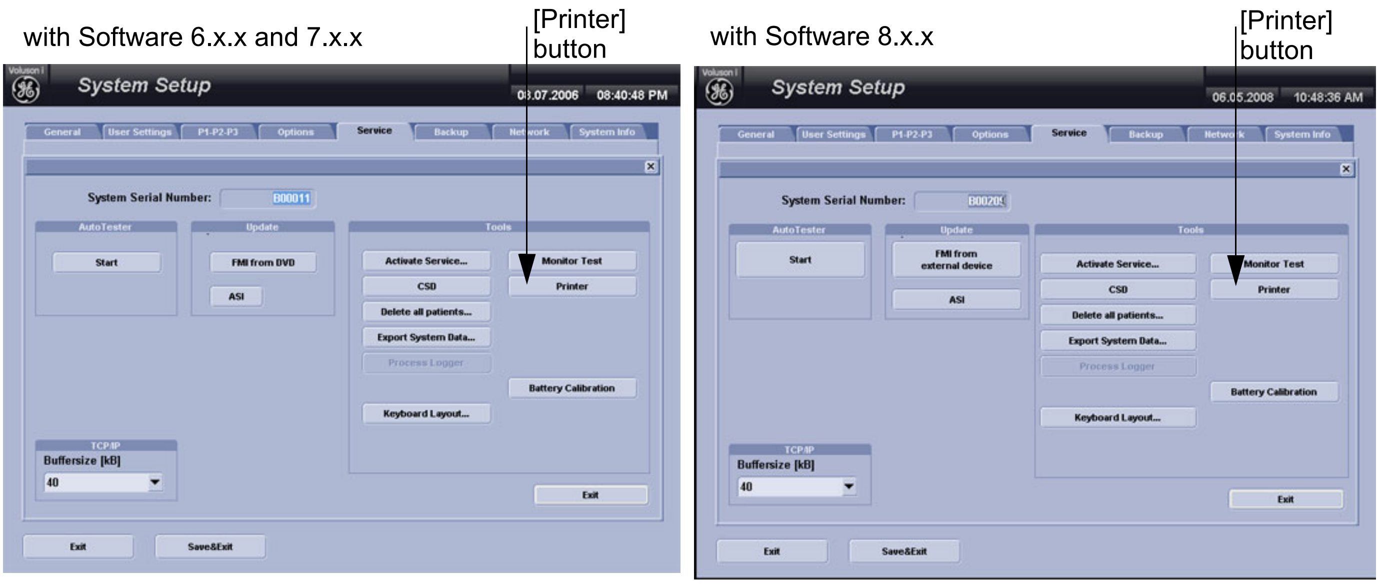
Click Finish to close the wizard.

Figure 3-105 Finish installation

7.) Close all open windows and verify the correct settings in the printer "Properties", see: Section 3-7-5 "Adjustment of Printer Settings" on page 3-91.

3-7-4 Printer Installation manually

1.) Press the **UTILITIES** key on the keyboard.
2.) In the “Utilities” menu on the left side of the screen, select SYSTEM to invoke the setup desktop.
3.) Select the SERVICE page. The “password window” appears automatically.
4.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


with Software 6.x.x and 7.x.x

[Printer] button

with Software 8.x.x

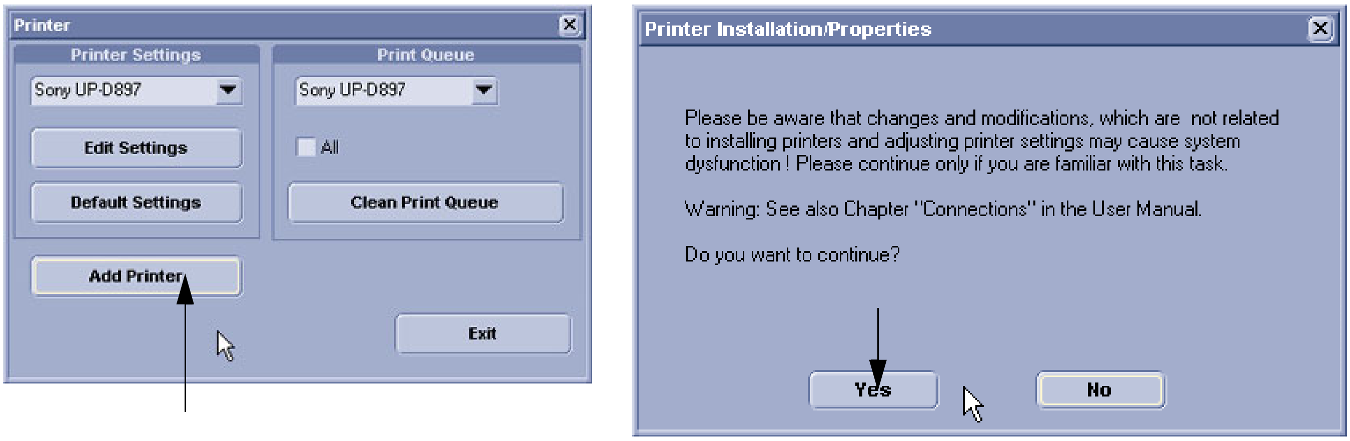
[Printer] button

System Setup
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
AutoTester
Start
Update
FMI from DVD
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
40
Exit
Save&Exit

Figure 3-106 Service Tools window

5.) Click on the PRINTER button.
6.) Click the ADD PRINTER button.

A warning message appears:
Please read this message carefully and click YES if you have skills to do this.


Printer
Printer Settings
Sony UP-D897
Edit Settings
Default Settings
Add Printer
Print Queue
Sony UP-D897
☐ All
Clean Print Queue
Exit
Printer Installation/Properties

Please be aware that changes and modifications, which are not related to installing printers and adjusting printer settings may cause system dysfunction ! Please continue only if you are familiar with this task.

Warning: See also Chapter "Connections" in the User Manual.

Do you want to continue?

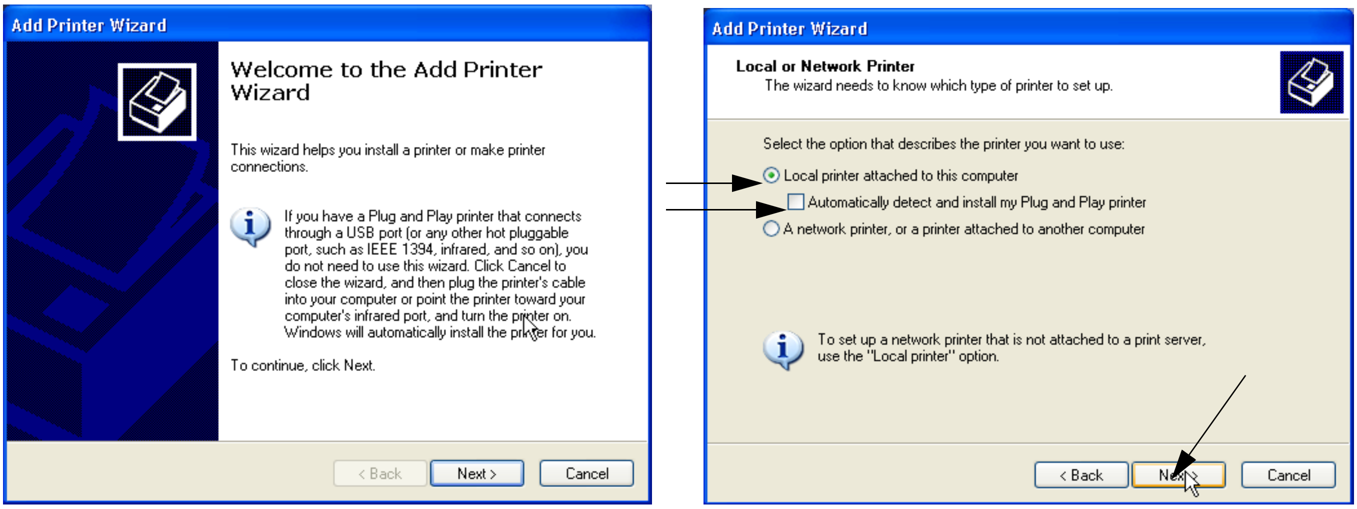
Yes
No

Figure 3-107 Add Printer and Printer Installation/Properties

Click the NEXT button to start the Add Printer Wizard.

3-7-4 Printer Installation manually (cont'd)

7.) Select the 'Local Printer', deselect "Automatically install Plug and Play printer" and then click NEXT.


Add Printer Wizard
< Back
Next >
Cancel
Add Printer Wizard
< Back
Next >
Cancel

Welcome to the Add Printer Wizard

This wizard helps you install a printer or make printer connections.

If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.

To continue, click Next.

Local or Network Printer
The wizard needs to know which type of printer to set up.

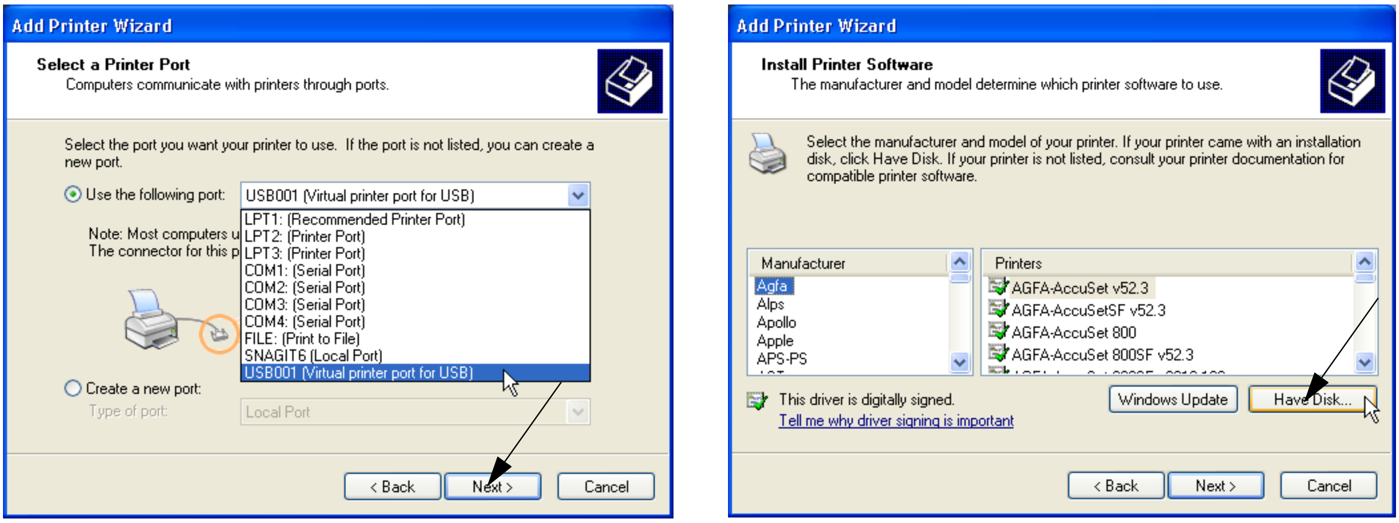
Select the option that describes the printer you want to use:

● Local printer attached to this computer
☐ Automatically detect and install my Plug and Play printer
○ A network printer, or a printer attached to another computer

To set up a network printer that is not attached to a print server, use the "Local printer" option.

Figure 3-108 Add Printer Wizard

8.) Select the corresponding Printer Port (e.g., Figure 3-109 = USB001) and click NEXT.


Add Printer Wizard
< Back
Next >
Cancel
Add Printer Wizard
Manufacturer
Agfa
Alps
Apollo
Apple
APS-PS
Printers
AGFA-AccuSet v52.3
AGFA-AccuSetSF v52.3
AGFA-AccuSet 800
AGFA-AccuSet 800SF v52.3
Windows Update
Have Disk...
< Back
Next >
Cancel

Select a Printer Port
Computers communicate with printers through ports.

Select the port you want your printer to use. If the port is not listed, you can create a new port.

● Use the following port: USB001 (Virtual printer port for USB)

LPT1: (Recommended Printer Port)
LPT2: (Printer Port)
LPT3: (Printer Port)
COM1: (Serial Port)
COM2: (Serial Port)
COM3: (Serial Port)
COM4: (Serial Port)
FILE: (Print to File)
SNAGIT6 (Local Port)
USB001 (Virtual printer port for USB)

Note: Most computers u
The connector for this p

○ Create a new port:
Type of port: Local Port

Install Printer Software
The manufacturer and model determine which printer software to use.

Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for compatible printer software.

This driver is digitally signed.
Tell me why driver signing is important

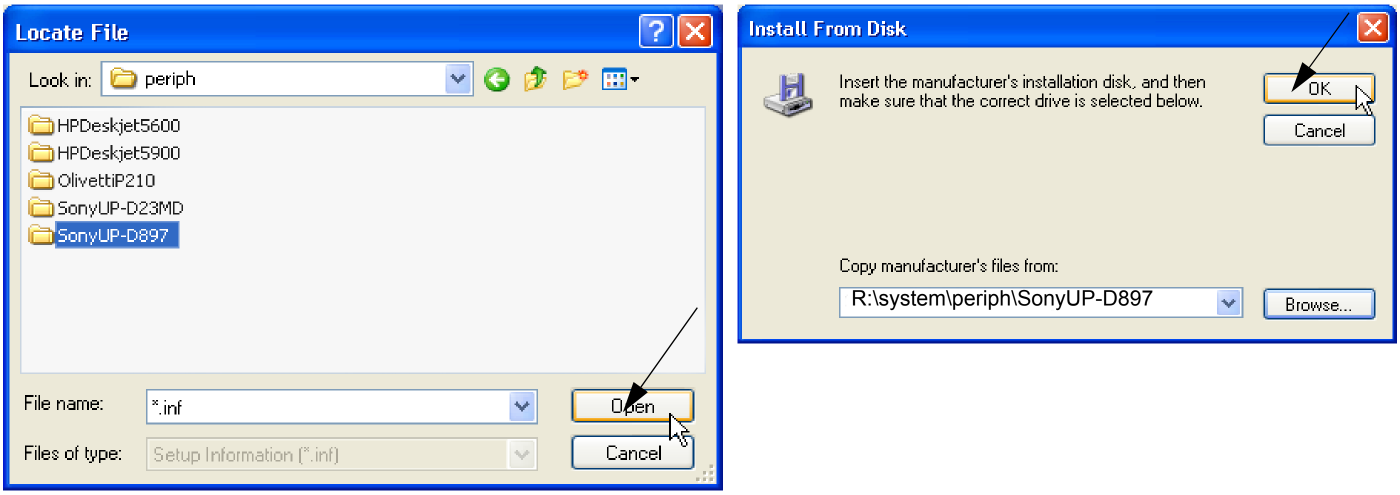
Figure 3-109 Select Printer Port / Have Disk...

9.) In the following window select the HAVE DISK button.

3-7-4 Printer Installation manually (cont'd)

10.)Use the BROWSE button to search the Printer Driver path (**R:\system\periph\xxxx**).

11.)Click OPEN. Select the “xxx.inf” file and click OPEN again.


Locate File
Look in:
periph
HPDeskjet5600
HPDeskjet5900
OlivettiP210
SonyUP-D23MD
SonyUP-D897
File name:
*.inf
Files of type:
Setup Information (*.inf)
Open
Cancel
Install From Disk
OK
Cancel
Browse...

Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.

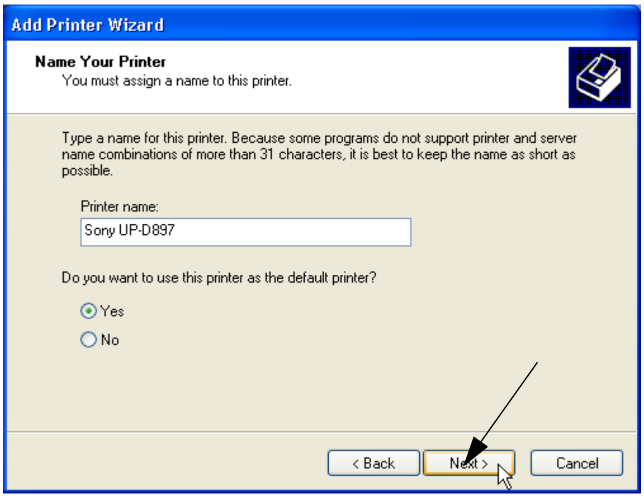
Copy manufacturer's files from:
R:\system\periph\SonyUP-D897

Figure 3-110 Select Printer Driver path (R:\system\periph\....) / verify selected Printer Driver path

12.)Verify the selected Printer Driver path and confirm with OK.

13.)Select the manufacturer and model of your printer and confirm with the NEXT button.

14.)Assign a name, decide if printer should be used as default printer and confirm with NEXT.


Add Printer Wizard
Name Your Printer
< Back
Next >
Cancel

You must assign a name to this printer.

Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.

Printer name:
Sony UP-D897

Do you want to use this printer as the default printer?

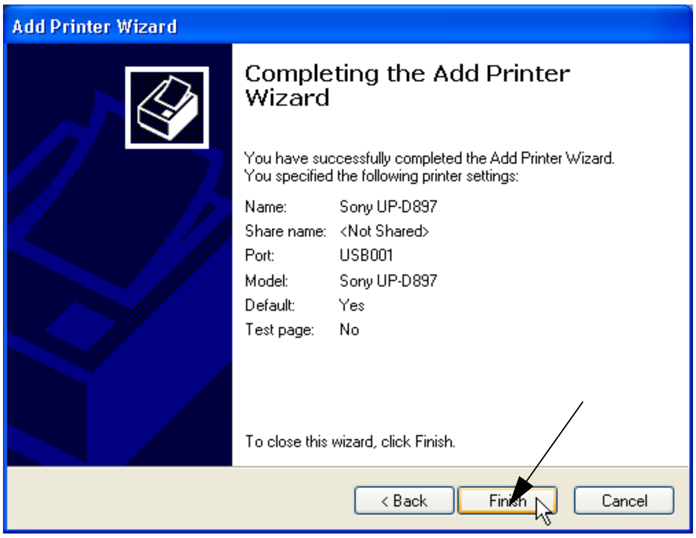
● Yes
○ No

Figure 3-111 Assign name

NOTE: If the “Printer Sharing” window appears, select ‘Do not share this printer‘ and confirm with NEXT.

3-7-4 Printer Installation manually (cont'd)

15.)The “Complete the Add Printer Wizard” window appears on the screen.



Completing the Add Printer Wizard

You have successfully completed the Add Printer Wizard.
You specified the following printer settings:

Name: Sony UP-D897
Share name: <Not Shared>
Port: USB001
Model: Sony UP-D897
Default: Yes
Test page: No

To close this wizard, click Finish.

Figure 3-112 Complete manual Printer Installation

16.)Complete the manual Printer Installation with the FINISH button.

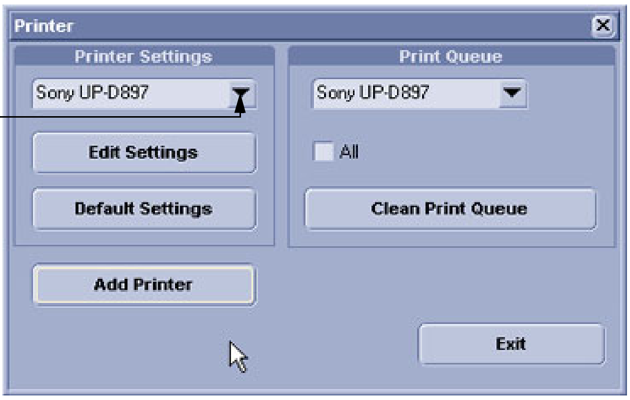
NOTE: If the message “The software you are installing for this hardware has not passed Windows ....” appears, click CONTINUE ANYWAY.

17.)Close all open windows, close the “System Setup” with SAVE & EXIT and restart the system (turn off and on the system).

⚠ **NOTICE** After boot up of the system, verify the correct settings in the printer “Properties”, see: Section 3-7-5 "Adjustment of Printer Settings" on page 3-91.

3-7-5 Adjustment of Printer Settings

1.) After system restart, press the **UTILITIES** key on the alphanumeric keyboard and then select the SYSTEM item from the menu area on the left side of the screen.
2.) Select the SERVICE page. The “password window” appears automatically.
3.) Enter the password SHE and click the ACCEPT button.
4.) Click on the PRINTER button.
5.) Select the desired printer from the pull-down menu and click the EDIT SETTINGS button.
6.) Confirm the warning message with the YES button. The **“Printer Properties”** appear.


Printer
Printer Settings
Sony UP-D897
Edit Settings
Default Settings
Print Queue
Sony UP-D897
☐ All
Clean Print Queue
Add Printer
Exit

select the desired printer from the pull-down menu

Figure 3-113 Select the desired printer

To adjust the UP-D897 Printer see: Section 3-7-5-1 "UP-D897 - Printer Settings" .

To adjust the UP-D23MD Printer see: Section 3-7-5-2 "UP-D23MD/UP-D25MD - Printer Settings" .

To adjust the Mitsubishi Printer see: Section 3-7-5-3 "Mitsubishi Printer Settings"

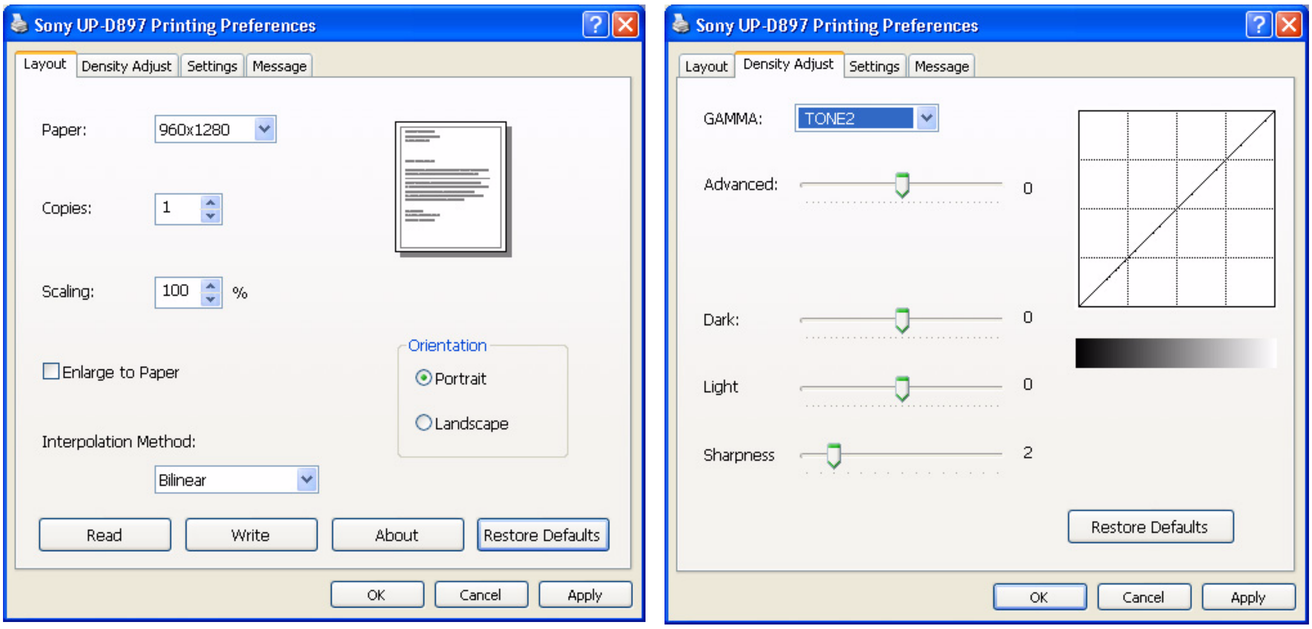
To adjust the Bluetooth Printer see: Section 3-7-5-4 "Bluetooth Deskjet - Printer Settings"

⚠ **WARNING** ***After each printer installation, the leakage currents have to be measured acc. IEC 60601-1 resp. UL 60601-1 (see: Section 10-7-2 on page 10-13).***

3-7-5-1 UP-D897 - Printer Settings

1.) Call up the **‘Printer Preferences’**; operation see: Section 3-7-5 "Adjustment of Printer Settings" .

2.) Select the LAYOUT page (see: Figure 3-114 below) and select:
  - Paper: **960x1280**
  - Orientation: **Portrait**
  - Interpolation Method: **Bilinear**



Sony UP-D897 Printing Preferences

Paper: 960x1280
Copies: 1
Scaling: 100 %
☐ Enlarge to Paper
Orientation: ● Portrait ○ Landscape
Interpolation Method: Bilinear

Sony UP-D897 Printing Preferences

GAMMA: TONE2
Advanced: 0
Dark: 0
Light: 0
Sharpness 2

Layout
Density Adjust
Settings
Message
Read
Write
About
Restore Defaults
OK
Cancel
Apply
Layout
Density Adjust
Settings
Message
Restore Defaults
OK
Cancel
Apply

Figure 3-114 Layout + Density Adjust page

3.) Select the DENSITY ADJUST page (see: Figure 3-114, above) and select:
  - Gamma: **TONE2**
  - Sharpness = **0**; Dark = **0**; Light = **0** ; Sharpness = **2**

4.) For saving the adjusted printer settings click APPLY and then OK.
Finally close the ‘Printers’ -window with the close button and exit System Setup with SAVE&EXIT.

5.) Assign the Printer to the remote keys **P1**, **P2** and/or **P3**;
see: Section 3-7-6 "Printer Remote Control Selection" on page 3-97.

6.) **Turn off** the system!

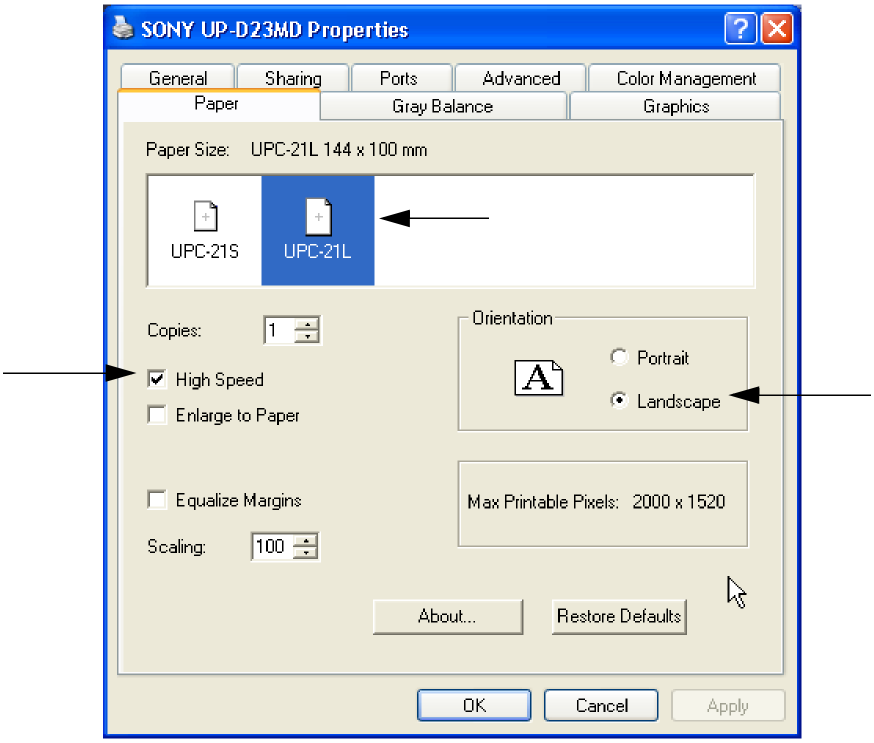
3-7-5-2 UP-D23MD/UP-D25MD - Printer Settings

1.) Call up the **'Printer Preferences'**; operation see: Section 3-7-5 "Adjustment of Printer Settings" .

NOTICE Settings for Paper Size MUST match with the used Paper (large/small) and also the right color ink cartridge has to be used. Otherwise you will get an error message at printing.

2.) Select the **PAPER** page and select:

- Paper Size: **UPC-23L** (large) / UPC-23S (small)
- Orientation: **Landscape** (recommended when using large paper size)
- **High Speed** (check mark on)


SONY UP-D23MD Properties
General
Sharing
Ports
Advanced
Color Management
Paper
Gray Balance
Graphics
UPC-21S
UPC-21L
About...
Restore Defaults
OK
Cancel
Apply

Paper Size: UPC-21L 144 x 100 mm

Copies: 1

☑ High Speed

☐ Enlarge to Paper

☐ Equalize Margins

Scaling: 100

Orientation

○ Portrait

● Landscape

Max Printable Pixels: 2000 x 1520

Figure 3-115 Paper page

3-7-5-2 UP-D23MD/UP-D25MD - Printer Settings (cont'd)

3.) Select the GRAPHICS page. From the “Color Adjust” pop-up menu select:

a.) Color Balance: Cyan = **0**; Magenta = **0**; Yellow = **0**

b.) Gamma Select: **Gamma 1**

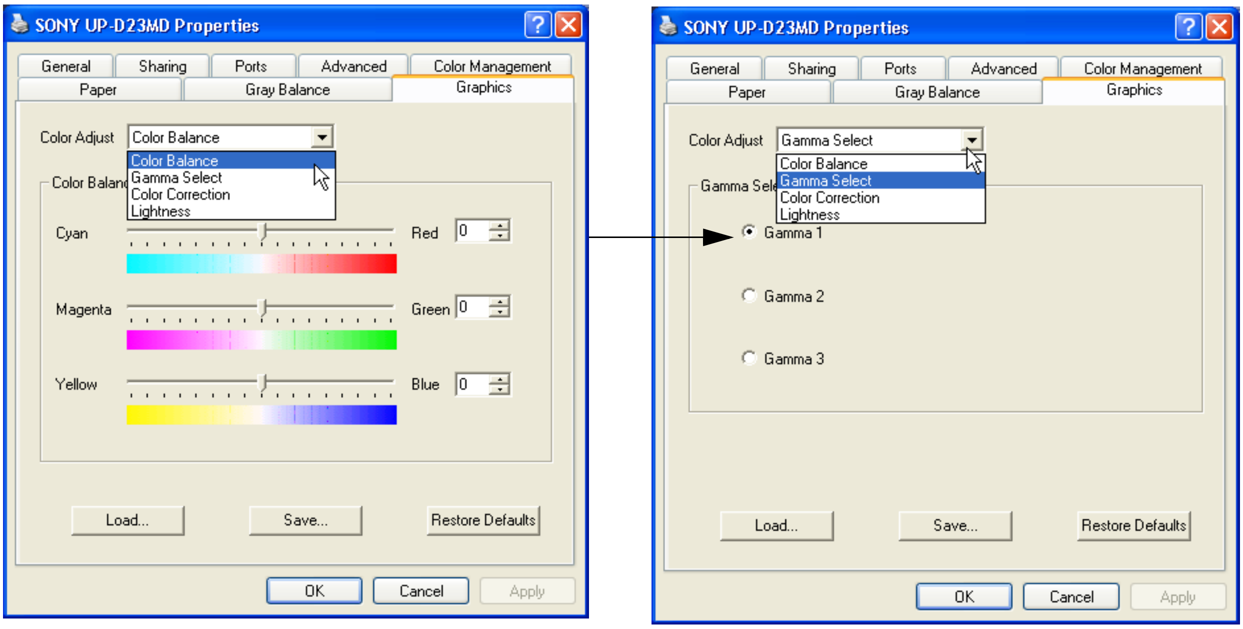

SONY UP-D23MD Properties
General
Sharing
Ports
Advanced
Color Management
Paper
Gray Balance
Graphics
Color Adjust
Color Balance
Gamma Select
Color Correction
Lightness
Cyan
Magenta
Yellow
Red
Green
Blue
0
0
0
Gamma 1
Gamma 2
Gamma 3
Load...
Save...
Restore Defaults
OK
Cancel
Apply

Figure 3-116 Graphics page (Color Balance + Gamma Select)

c.) Color Correction: set **Printer Hardware Color Correction**

d.) Lightness: Sharpness = **7** or **8**; Dark = **0**; Gamma = **-12**; Light = **8**

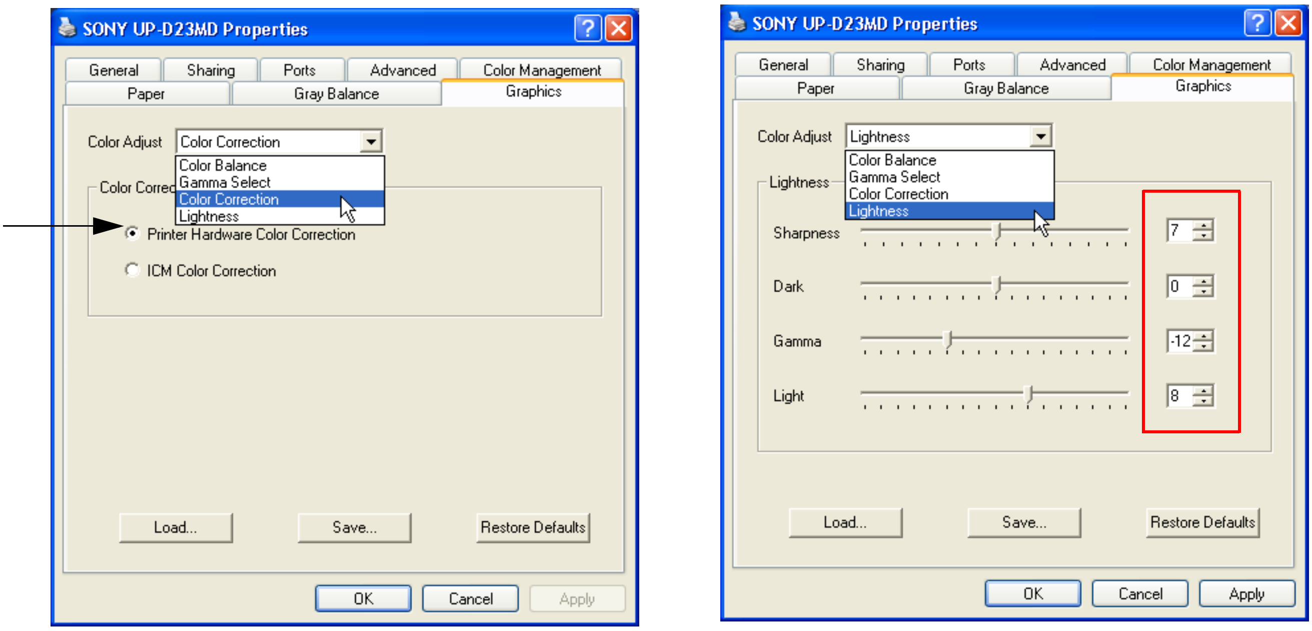

SONY UP-D23MD Properties
General
Sharing
Ports
Advanced
Color Management
Paper
Gray Balance
Graphics
Color Adjust
Color Correction
Color Balance
Gamma Select
Color Correction
Lightness
Printer Hardware Color Correction
ICM Color Correction
Lightness
Sharpness
Dark
Gamma
Light
7
0
-12
8
Load...
Save...
Restore Defaults
OK
Cancel
Apply

Figure 3-117 Graphics page (Color Correction + Lightness)

4.) For saving the adjusted printer settings click APPLY and then OK.
Finally close the ‘Printers’-window with the close button and exit System Setup with SAVE&EXIT.

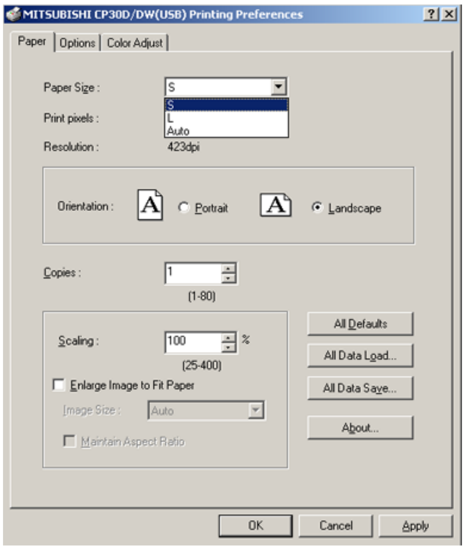
3-7-5-3 Mitsubishi Printer Settings

3-7-5-3-1 Color Printer CP30

1.) Call up the **'Printer Preferences'**; operation see: Section 3-7-5 "Adjustment of Printer Settings" .

2.) Select the **PAPER** page and select:

- Paper Size: L (large)
- Orientation: Landscape (recommended when using large paper size)


MITSUBISHI CP30D/DW(USB) Printing Preferences
?
Paper
Options
Color Adjust
S
L
Auto
All Defaults
All Data Load...
All Data Save...
About...
OK
Cancel
Apply

Paper Size : S
Print pixels :
Resolution : 423dpi
Orientation : ○ Portrait ● Landscape
Copies : 1 (1-80)
Scaling : 100 % (25-400)
☐ Enlarge Image to Fit Paper
Image Size : Auto
☐ Maintain Aspect Ratio

Figure 3-118 Paper page

3.) For saving the adjusted printer settings click APPLY and then OK. Finally close the "Printer Preferences" window with the close button and exit System Setup with SAVE&EXIT.

3-7-5-3-2 B&W Printer P95

1.) Printer Settings directly on the B&W Printer:

a.) Press the "**BRT**" button on the printer and adjust Brightness to "0" by using the turning knob.

b.) Press the "**CONT**" button on the printer and adjust Contrast to "0" by using the turning knob.

c.) Press the "**SHARP**" button on the printer and adjust Sharpness to "3" by using the turning knob

d.) Press the "**FUNC**" button on the printer and adjust Gamma to "r5" by using the turning knob.

For saving and exit press the "**BRT**" button twice.

OPEN
0
BRT
CONT
SHARP
FUNC
FEED
COPY
RST
MITSUBISHI
P95

Brightness: 0 **Contrast: 0**

OPEN
3
r5
BRT
CONT
SHARP
FUNC
FEED
COPY
RST
MITSUBISHI
P95

Sharpness: 3 **Gamma: 5**

Figure 3-119 Printer Settings - B&W Printer

If necessary remove the CD and **restart** the system (turn off and on the system).

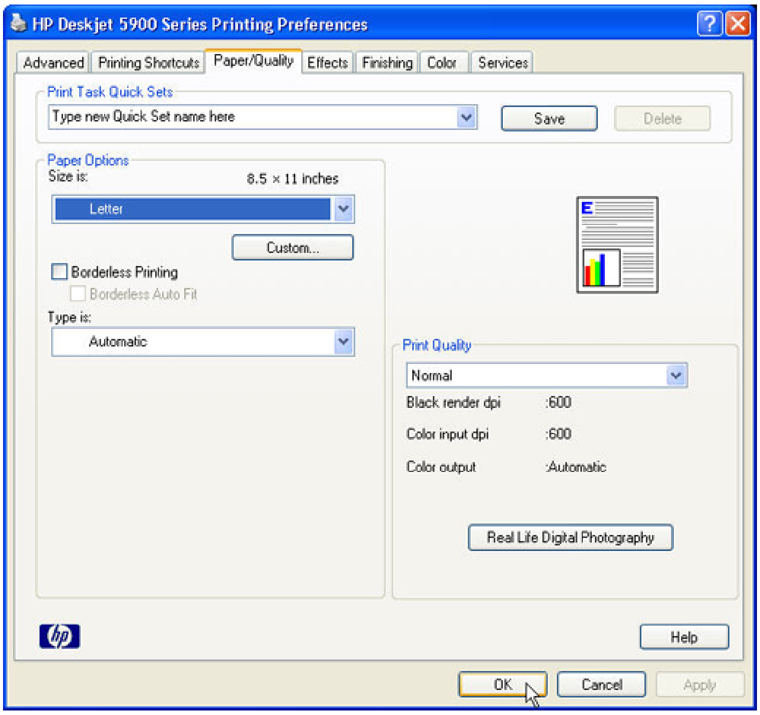
3-7-5-4 Bluetooth Deskjet - Printer Settings

CAUTION **The Bluetooth Connection Set as well as the color printer MUST NOT be installed by the user! For installation please contact your local distributor or GE service representative.**

1.) Call up the **'Printer Properties'**; operation see: Section 3-7-5 "Adjustment of Printer Settings" .

2.) Select the **GENERAL** page and click the PRINTING PREFERENCES... button.

3.) Select the **PAPER/QUALITY** page and select the adequate paper size.


HP Deskjet 5900 Series Printing Preferences
Advanced
Printing Shortcuts
Paper/Quality
Effects
Finishing
Color
Services
Print Task Quick Sets
Save
Delete
Paper Options
Custom...
Print Quality
Real Life Digital Photography
Help
OK
Cancel
Apply

Type new Quick Set name here

Size is: 8.5 × 11 inches

Letter

☐ Borderless Printing

☐ Borderless Auto Fit

Type is: Automatic

Normal

Black render dpi :600

Color input dpi :600

Color output :Automatic

Figure 3-120 Paper/Quality page

4.) For saving the adjusted paper size settings click APPLY and then OK.

5.) In the next window, click OK again.
Finally close the 'Printers' -window with the close button and exit System Setup with SAVE&EXIT.

6.) Assign the Deskjet printer as Report Printer; see: Section 3-7-6 "Printer Remote Control Selection" on page 3-97.

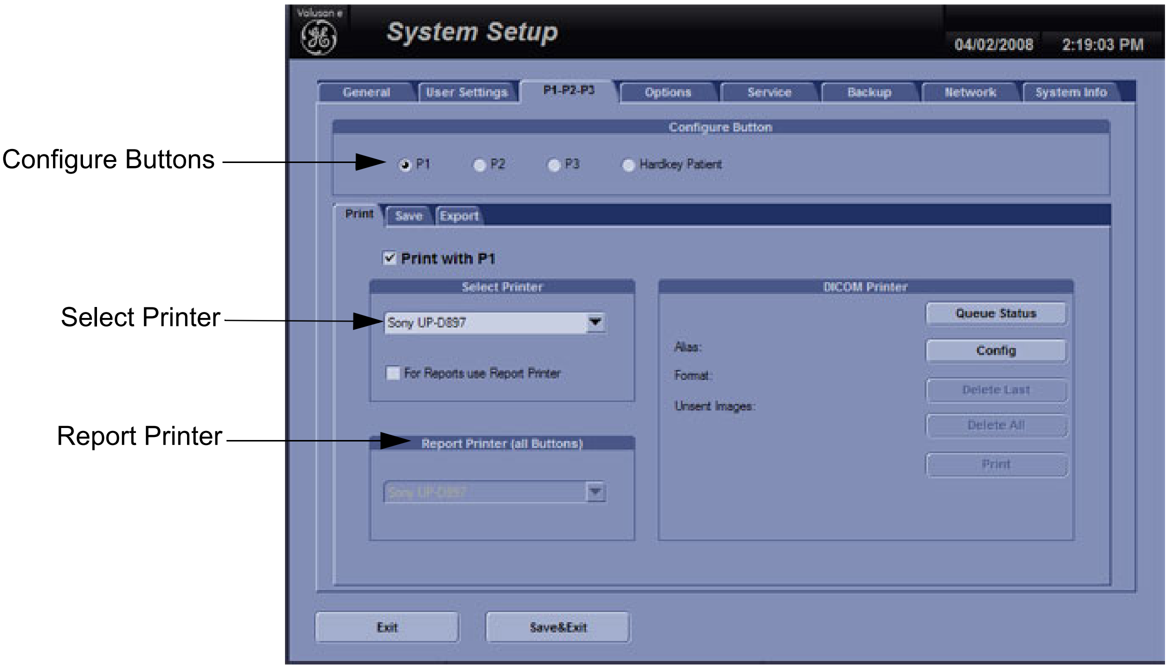
7.) Print report page(s) containing measurements.
For operation see Basic User Manual of Voluson i / Voluson e.

8.) **Turn off** the system!

3-7-6 Printer Remote Control Selection

To assign a Printer to the remote keys **P1**, **P2** and/or **P3**:

1.) Press the **UTILITIES** key on the keyboard.
2.) In the “Utilities” menu on the left side of the screen select SYSTEM to invoke the setup desktop.
3.) Select the P1-P2-P3 page. (If not currently shown, select the [Print] tab).


Configure Buttons
Select Printer
Report Printer
Voluson e
System Setup
04/02/2008
2:19:03 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Configure Button
Hardkey Patient
Print
Save
Export
Select Printer
DICOM Printer
Queue Status
Config
Delete Last
Delete All
Print
Alias:
Format:
Unsent Images:
Report Printer (all Buttons)
Exit
Save&Exit

● P1 ○ P2 ○ P3 ○ Hardkey Patient

☑ Print with P1

Select Printer: Sony UP-D897

☐ For Reports use Report Printer

Report Printer (all Buttons): Sony UP-D897

Figure 3-121 P1-P2-P3 page - Print tab

- **Configure “Remote” Buttons:** Select the desired remote control button.
- **Select Printer:** Select the desired Printer for the selected remote control button.
  - If it is desired, check mark “For Reports use Report Printer.”
- **Report Printer (all Buttons):** Select the desired Report Printer from the drop-down menu.

NOTICE The selected Report Printer is usually used for printing reports and images from Sonoview.

Section 3-8
System Configuration

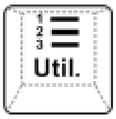
3-8-1 System Setup

Modifications of system parameters are supported by diverse dialog pages and windows on the system setup desktop:

- **General** - Date, Time, Clinic Name, Language, Screen saver, etc.
- **User Settings** - to save User programs, 3D/4D programs, Auto Text, Doppler 2D Refresh, etc.
- **P1-P2-P3** - to adjust assignment of Remote keys **P1**, **P2** and **P3** (selection of Printers, Save/Send destinations and Export options) and HARDKEY PATIENT (patient data entry menu)
- **Option** - shows which options are installed in the system
- **Service** - enter the password to get access to the Service Tools functions
- **Backup** - Save/Load User Settings Only, Save/Load/Delete Full Backup
- **Network** - to set up all DICOM®, Sonoview and Network configuration nodes
- **System Info** - shows which Software/Hardware version is installed in the system

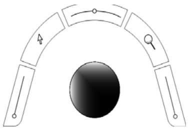
NOTICE More detailed information pertaining System Setup adjustments is found in Voluson i / Voluson e Basic User Manual; see: Table 9-26, “System Manuals - Voluson i,” on page 9-44 and Table 9-27, “System Manuals - Voluson e,” on page 9-46.

To invoke the Setup procedure:

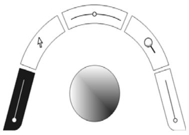


1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item to activate the setup desktop screen.

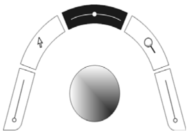
In general operations are done with the trackball and the trackball keys (mouse emulation).



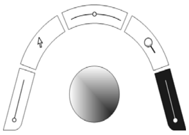
Trackball (mouse position):
positions the pointing device (arrow) on the desktop



left trackball key (left mouse button):
sets, fixates markers and activates pages/buttons etc. marked by the pointing device



upper trackball key (right mouse button):
no function in system desktop

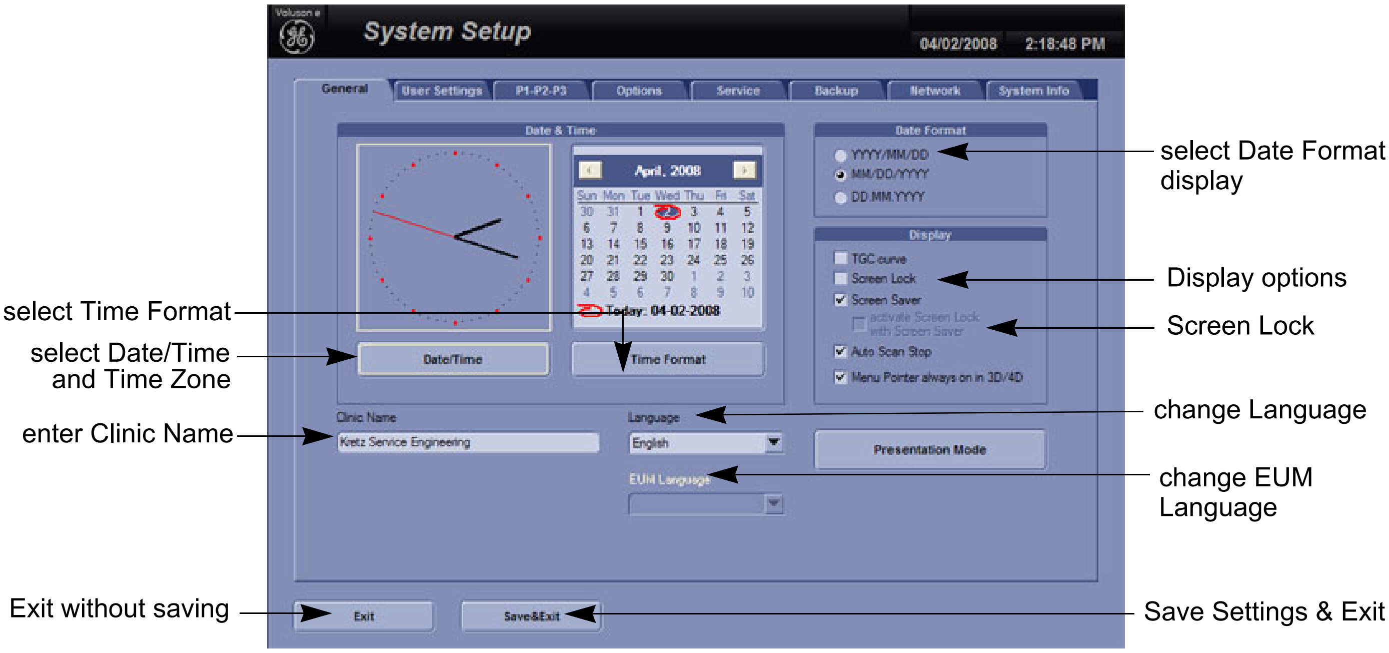


right trackball key (left mouse button):
sets, fixates markers and activates pages/buttons etc. marked by the pointing device

3-8-1-1 How to enter Date and Time

Select the GENERAL page in the System Setup see: Figure 3-122.

1.) Select the “Date Format” (only one can be active).
2.) Click the DATE/TIME button to activate a sub dialog window to enter date, time and time zone.
3.) Click the TIME FORMAT button to activate a sub dialog window to choose preferred time format.
4.) Select the “Date Format” display.
5.) Click SAVE&EXIT to save Settings and exit System Setup.


Voluson e
System Setup
04/02/2008
2:18:48 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Date & Time
April, 2008
Sun Mon Tue Wed Thu Fri Sat
Today: 04-02-2008
Date/Time
Time Format
Date Format
Display
Presentation Mode
EUM Language
Exit
Save&Exit
select Date Format display
Display options
Screen Lock
change Language
change EUM Language
Save Settings & Exit
select Time Format
select Date/Time and Time Zone
enter Clinic Name
Exit without saving

Date Format:
○ YYYY/MM/DD
● MM/DD/YYYY
○ DD.MM.YYYY

Display:
☐ TGC curve
☐ Screen Lock
☑ Screen Saver
☐ activate Screen Lock with Screen Saver
☑ Auto Scan Stop
☑ Menu Pointer always on in 3D/4D

Clinic Name: Kretz Service Engineering

Language: English

Figure 3-122 System Setup - General page

3-8-1-1-1 How to disable the automatic Daylight Saving Time
see: Chapter 6 - Daylight Saving Time (DST) - New Dates on page 6-12

3-8-1-2 How to enter Hospital Name

Select the GENERAL page in the System Setup see: Figure 3-122.

1.) Select the text box to enter a new “Clinic Name” with the keyboard.
2.) Click SAVE&EXIT to save Settings and exit System Setup.

The clinic name will be copied into the Hospital ID in the information header.

3-8-1-3 How to change Language and/or EUM Language

Select the GENERAL page in the System Setup see: Figure 3-122.

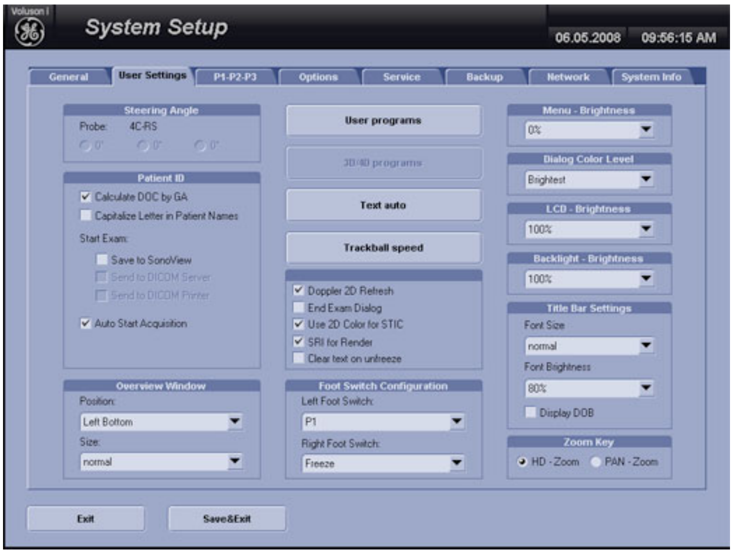
1.) Select the desired language from the pop-up menu.
2.) Click SAVE&EXIT to save Settings and exit System Setup.

NOTE: After changing the language the system has to reboot.

3-8-1-4 How to adjust function of the Footswitch (Left/Right)

NOTE: The Footswitch is available with Software 7.x.x. and higher

Select the USER SETTINGS page in the System Setup.


Voluson i
System Setup
06.05.2008
09:56:15 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Steering Angle
Patient ID
Overview Window
User programs
3D/4D programs
Text auto
Trackball speed
Foot Switch Configuration
Menu - Brightness
Dialog Color Level
LCD - Brightness
Backlight - Brightness
Title Bar Settings
Zoom Key
Exit
Save&Exit

Probe: 4C-RS
○ 0° ○ 0° ○ 0°

☑ Calculate DOC by GA
☐ Capitalize Letter in Patient Names
Start Exam:
☐ Save to SonoView
☐ Send to DICOM Server
☐ Send to DICOM Printer
☑ Auto Start Acquisition

Position: Left Bottom
Size: normal

☑ Doppler 2D Refresh
☐ End Exam Dialog
☑ Use 2D Color for STIC
☑ SRI for Render
☐ Clear text on unfreeze

Left Foot Switch: P1
Right Foot Switch: Freeze

Menu - Brightness: 0%
Dialog Color Level: Brightest
LCD - Brightness: 100%
Backlight - Brightness: 100%
Font Size: normal
Font Brightness: 80%
☐ Display DOB
● HD - Zoom ○ PAN - Zoom

Figure 3-123 System Setup - User Settings

1.) Select desired function of the Footswitch Left and Right.
2.) Click SAVE&EXIT to save Settings and exit System Setup.

3-8-1-5 How to activate Screen Lock

Select the GENERAL page in the System Setup see: Figure 3-122.

1.) Check mark “Screen Lock”.

a.) If no password previously entered, the following dialog appears.

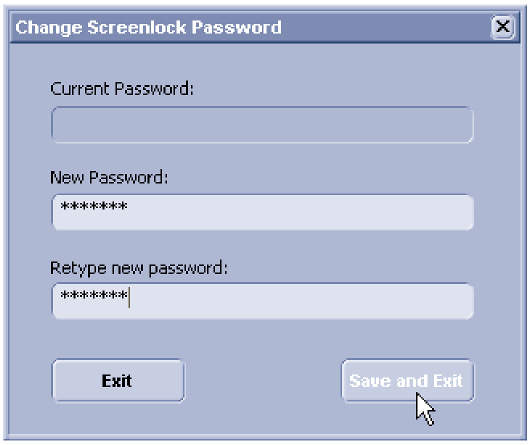

Change Screenlock Password
Current Password:
New Password:
****
Retype new password:
****
Exit
Save and Exit

Figure 3-124 Screenlock Password

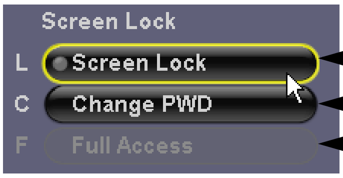
b.) Enter “New Password”.

NOTE: A new screen lock password must be at least 6 characters long and has a maximum length of 80 characters. The password must contain at least 2 non-letter characters, 0...9 or !@#$%^*().

c.) “Retype new Password” and then click SAVE&EXIT to save new screen lock password.

2.) Click SAVE&EXIT to save Settings and exit System Setup.

Status of the Screen Lock is shown in the menu area of the “Utilities” menu. I


Screen Lock
L Screen Lock
C Change PWD
F Full Access

Screen Lock “hooked” in System Setup
to change current Password
only available if “Emergency Mode” is activated

Figure 3-125 Screen Lock status - shown in “Utilities” menu

NOTICE The Screen Lock password cannot be reset by the user!

3-8-1-6 How to adjust LCD Brightness

see: Chapter 6 - LCD Brightness on page 6-3.

3-8-1-7 How to change the Keyboard Layout

see: Chapter 6 - Setup the Voluson i / Voluson e Keyboard Language Layout on page 6-10.

3-8-2 Measure Setup

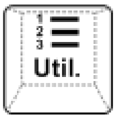
Modifications of system parameters are supported by diverse dialog pages and windows on the measure setup desktop.

NOTICE Parameters and possible adjustments mostly depend on the selected Application!

- **Measure & Calc** - shows all settings, which are used for generic measurements as well as calculations in different applications
- **Application Parameters** - to adjust: status on freeze for different modes, Manual Trace method, Calculation Ratio, etc.
- **Global Parameters** - to select: if the measurement results should be deleted (= Yes), or kept on screen (= No) as soon as cine mode is activated, cursor type and size, Font size and color of measure results, position of measure results for different modes, etc.

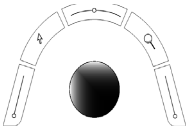
NOTICE More detailed information pertaining System Setup adjustments is found in Voluson i / Voluson e Basic User Manual; see: Table 9-26, “System Manuals - Voluson i,” on page 9-44 and Table 9-27, “System Manuals - Voluson e,” on page 9-46.

To invoke the Setup procedure:

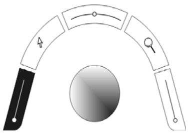


1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the MEASURE item to activate the setup desktop screen.

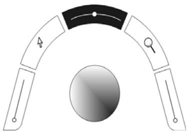
In general operations are done with the trackball and the trackball keys (mouse emulation).



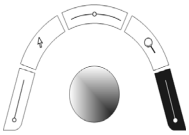
Trackball (mouse position):
positions the pointing device (arrow) on the desktop



left trackball key (left mouse button):
sets, fixates markers and activates pages/buttons etc. marked by the pointing device



upper trackball key (right mouse button):
no function in system desktop



right trackball key (left mouse button):
sets, fixates markers and activates pages/buttons etc. marked by the pointing device

3-8-3 Approved Optional Peripherals

The following table lists the internal peripherals available for use with the Voluson i / Voluson e portable ultrasound system and details their method of connection.

Table 3-13 Approved Peripherals

Device	Manufacturer	Model	Method of Connection
B/W Video Printer	SONY	UP-D895MD UP-D897	USB-Port USB-Port
	MITSUBISHI	P95	
Digital Color Video Printer	SONY	UP-D23MD obsolete	USB-Port USB-Port USB-Port
		UP-D25MD	
	MITSUBISHI	CP30	
Line/DeskJet Printer (Bluetooth)	Hewlett Packard	HP 5940 obsolete	USB-Port (Bluetooth)
	Canon	Pixma MP600/MP610 obsolete	
	Canon	Pixma MP550	
	Hewlett Packard	HP Officejet H470	
	Hewlett Packard	HP Officejet 100	
Video Cassette Recorder	Mitsubishi	HS-MD3000U (NTSC) HS-MD3000E (PAL)	via VGA to S-Video converter
DVD Recorder	SONY	DVO-1000MD (PAL/NTSC)	via VGA to S-Video converter
Video Scan Converter	Canopus	TwinPact 100	VGA port
	Ophit	UVC-S100-A	
USB Hub	D-Link	DUB-H7	USB-Port
DVD+R/RW Drive	Addonics	AEPMRRWII88	USB-Port
	Samsung	SE-T084	USB-Port
	De Lock	SE-T084	USB-Port
	Teac	DV-W28U	USB-Port
USB Flash Memory device	SanDisk	Cruzer Micro 512MB	USB-Port
USB external Hard disk	Fujitsu	“Handydrive”	USB-Port
UPS (100V-130V)	Tripplite	SMART1200XLHG	VGA port
UPS (220V-240V)	Tripplite	SMX1200XLHG	VGA port
Wireless CardBus Adapter	CISCO Systems	Cisco Aironet 802.11a/b/g	PCMCIA
Battery Charger	Inspired Energy Inc.	CH5000	------------
Footswitch*	Steute	GP26	USB-Port
	Whanam		

BT Version: Footswitch (Steute) applicable at Voluson i / Voluson e systems with software BT’07 and higher.

BT Version: Footswitch (Whanam) only applicable at Voluson i / Voluson e systems with software CC200 BT’14 and higher.

3-8-4 External I/O Connectors

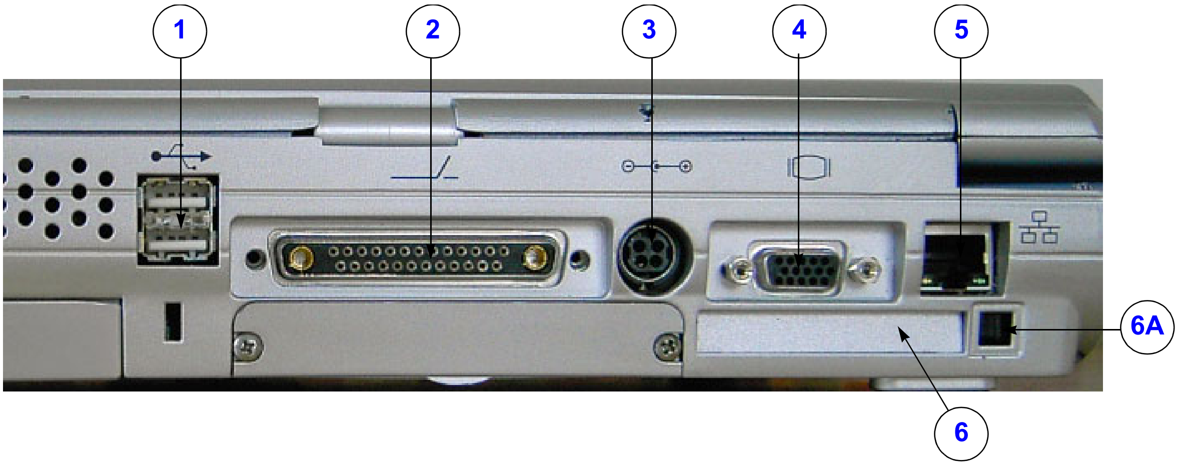


Figure 3-126 External I/O Connectors

Table 3-14 External I/O Connector Descriptions

Item	Connector Name	Table	Description
1	USB 1 and USB 2	Table 3-15	two interchangeable USB-2.0 ports (Printers, DVD+R/RW drive and other peripheral)
2	Docking connector		Connector for Voluson Station Docking Adapter
3	Port for DC IN		Connector for AC Adapter
4	VGA OUT	Table 3-16	print out VGA signal (VCR option via VGA to S-Video converter)
5	NETWORK	Table 3-17	twisted pair RJ-45 10/100 megabit/s LAN Base-TX Ethernet network connector (DICOM® input/output)
6	PCMCIA port (only available at GPC1-3)		Personal Computer Memory port for PC card
6A	Ejection lever		Ejection lever for PCMCIA device

3-8-4-1 External I/O Pin Outs

Table 3-15 USB 1, 2 Connectors

Pin No	Output Signal	Description
1	VCC	USB Power Supply
2	- Data	USB Data (-)
3	+ Data	USB Data (+)
4	GND	USB Power Ground

Table 3-16 VGA OUT Connector, Sub-D 15 Pin

Pin No	Output Signal	Description
1	VGA OUT1 R	Red
2	VGA OUT1 G	Green
3	VGA OUT1 B	Blue
4, 9,11,12,15	N/C	N/C
5, 6, 7, 8, 10	GND	GND
13	VGA OUT1 HS	H Sync
14	VGA OUT1 VS	V Sync

Table 3-17 Network Connector, RJ45 Modular 8 Pin

Pin No	Output Signal	Description
1	ETHER TD	Ethernet RD+
2	ETHER TD	Ethernet RD-
3	ETHER RD	Ethernet TD+
6	ETHER RD	Ethernet TD-
Others	NC	Non-connection

Electrical Specifications on VGA Connector

- Signal Level: 700 mV at 75 Ohm
- H/V Sync: TTL Level

3-8-5 External Cables - Maximum Lengths

Table below shows maximum permitted cable length of external cables, according to IEC60601-1-2.

Table 3-18 maximum cable lengths

Description	Maximum Cable Length	Type
Probe cable	2.5 m	shielded
USB cable	5 m	shielded; USB2.0 or better
LAN cable	80 m	shielded; Cat5e or better
VGA cable	15 m	shielded
AC-Power cable	4 m	unshielded
DC-Power cable	2 m	shielded

Section 3-9
Available Probes

See *Chapter 9 - Probes on page 9-50*, for part numbers to be used when ordering new or replacement service probes.

Section 3-10
Software/Option Configuration

For information on configuring Software Options, refer to the Voluson i / Voluson e Basic User Manual, Chapter 16.3.4, System Setup - Options.

⚠ **NOTICE** A password (encrypted Software Option string) enables a software option or a combination of software options. This password is specific for each Voluson i / Voluson e portable ultrasound system.

For information on configuring items like Clinic Name, Language, Display, Date/Time, Date Format and Time Format, etc. refer to the Voluson i / Voluson e Basic User Manual,
Chapter 16.3.1, System Setup - General.

For information on configuring User Settings, refer to the Voluson i / Voluson e Basic User Manual, Chapter 16.3.2, System Setup - User Settings.

For information on configuring assignment of the **P1**, **P2** and **P3** keys, refer to the
Voluson i / Voluson e Basic User Manual, Chapter 16.3.3, System Setup - P1-P2-P3.

For information on configuring Connectivity, refer to the Voluson i / Voluson e Basic User Manual, Chapter 16.3.7, System Setup - Network.

For information on configuring settings and parameters used for generic measurement as well as calculations in different applications, refer to the Voluson i / Voluson e Basic User Manual,
Chapter 17, Measure Setup.

Section 3-11
Connectivity Setup

The Voluson i / Voluson e portable ultrasound system can be connected to various connectivity devices. The following sections describe how to connect the system to a remote archive/work station or a DICOM® service, using a TCP/IP connection.

3-11-1 Connectivity Introduction

This section describes communication and connection options between the Voluson i / Voluson e ultrasound unit and other devices in the hospital information system.

The following scenarios are covered:

- A stand-alone Voluson i / Voluson e scanner; see: Section 3-11-1-3 on page 3-109.
- A Voluson i / Voluson e and one or several PC workstations - with Software 4D View installed - within a “Sneaker Net” environment. (“Sneaker Net” means that you use a DVD/CD to move data because no network is available); see: Section 3-11-1-4 on page 3-109.
- A Voluson i / Voluson e and a DICOM® server in a network; see: Section 3-11-1-5 on page 3-109.
- A Voluson i / Voluson e used in conjunction with a Voluson Station with its own built-in NIC; see: Section 3-11-1-6 on page 3-109

3-11-1-1 The Dataflow Concept

Communication between the Voluson i / Voluson e ultrasound unit and other information providers on the network takes the form of data flows. Each dataflow defines the transfer of patient information from either an input source to the unit, or from the unit to an output source (see examples in Figure 3-127 on page 3-108).

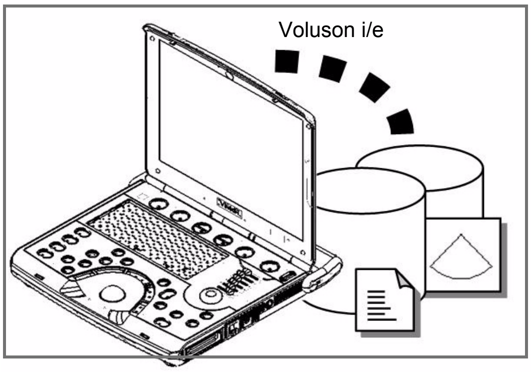
Patient information can include demographic data and images, as well as reports and Measurement and Analysis (M&A) data.

A dataflow is a set of pre-configured services. Selecting a dataflow will automatically customize the ultrasound unit to work according to the services associated with this dataflow.

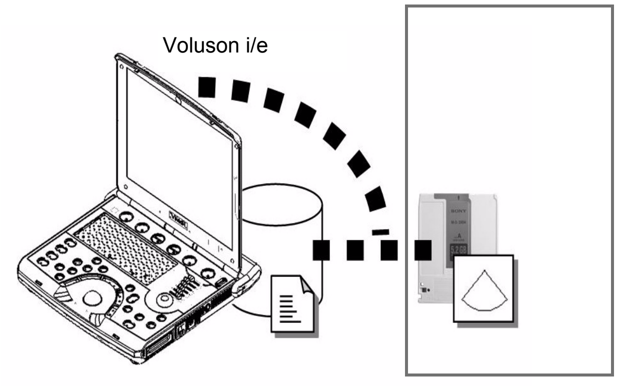
By utilizing data flows, the user can configure the Voluson i / Voluson e ultrasound unit to optimally meet the needs of the facility, while keeping the user interface unchanged. Once the dataflow is selected, the actual location of the database is entirely transparent.

3-11-1-2 Dataflow Examples

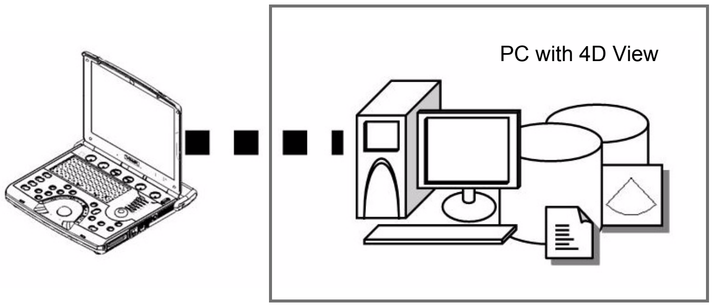
The local database is used for patient archiving.
Images are stored to internal hard drive.



The local database is used for patient archiving.
Images are stored to a DVD/CD.



A remote database is used for patient archiving.
Images are also stored to a remote archive.



Search in the DICOM® Modality Worklist, the patient found is copied into local database.

The patient information and the examination results are stored to the local database.

Images are stored to a DICOM® server and to an image network volume on the local hard drive.

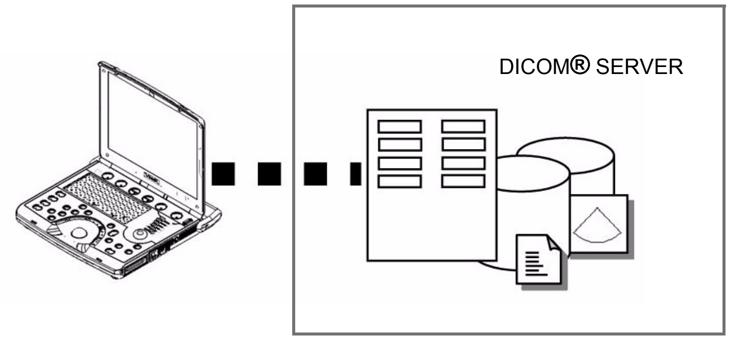


Figure 3-127 Examples of Dataflows

3-11-1-3 Stand-alone Voluson i / Voluson e

If digital images or 3D/4D data sets are stored, they should be saved in Sonoview (Image Management System software).

For Sonoview - Image Management functionality refer to the Basic User Manual of the Voluson i / Voluson e portable ultrasound system.

NOTICE To avoid loss of essential data, it is highly recommended to export/backup patient data as well as measurements using the DVD+R/RW drive or a mapped network drive at least once a month.

Physical Connection:

No network connection needed.

3-11-1-4 Voluson i/e + PC (with 4D View Software) within a “Sneaker Net”

A PC (one or several with 4D View software installed) is used for review and work on studies acquired on one or more Voluson i / Voluson e scanners without being connected in a network.

By means of Sonoview, the images are first stored on the Voluson i / Voluson e scanner’s hard drive and then exported from the scanner’s hard drive to a sneaker DVD/CD, and finally imported from the sneaker disk to the “4D View” PC’s internal hard drive.

For Sonoview - Image Management functionality refer to the Basic User Manual of the Voluson i / Voluson e portable ultrasound system.

NOTICE To avoid loss of essential data, it is highly recommended to export/backup patient data as well as measurements using the DVD+R/RW drive or a mapped network drive at least once a month.

Physical Connection:

No network connection needed.

3-11-1-5 Voluson i / Voluson e and DICOM® Server on a Network

In this configuration, the Voluson i / Voluson e is configured to work with a DICOM® server in a network environment. Usually, this will be the hospital network. Images are first saved on the local image buffer on the scanner. At the end of the examination, the images are sent to the DICOM® server via a DICOM® spooler. This scenario requires that the scanner is configured to be connected to the DICOM® server.

Physical Connection:

You will need one network cable.

1.) Connect one end of the cable to the Ethernet connector on the Voluson i / Voluson e.
2.) Connect the other end of the cable to the wall outlet.

NOTE: *If a Peer-to-Peer Network is connected to the hospital’s network, you may connect the Voluson i / Voluson e to the Peer-to-Peer Network.*

3-11-1-6 Voluson i / Voluson e used in conjunction with a Voluson Station with its own built-in NIC

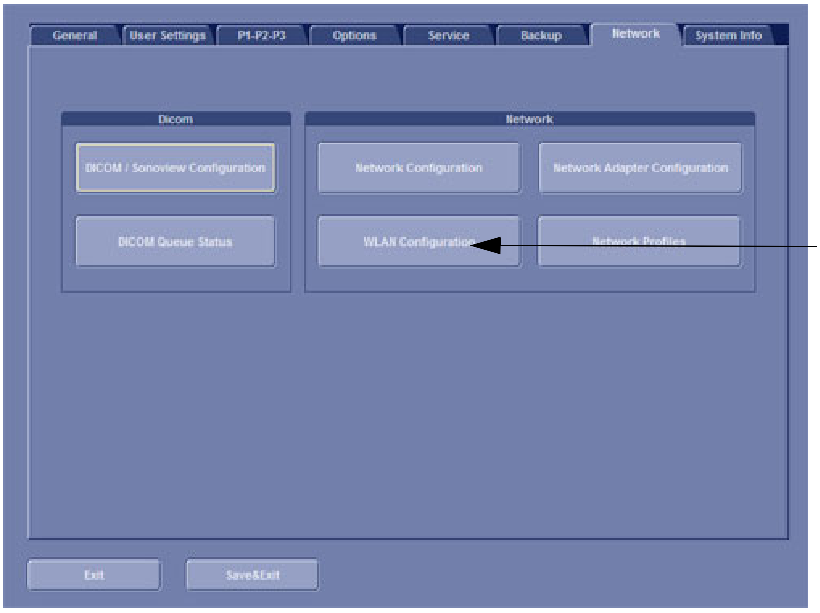
Assign two IP addresses to the Voluson i / Voluson e and to the Voluson Station - one for the Voluson i / Voluson e itself and one for the Voluson Station like 1.2.3.1 - Voluson i/e and 1.2.3.2 - Voluson Station. Then the system will seamlessly transition from one to the other when in or out of the Voluson Station. However both IP’s would need to be accounted for in some customer’s network with network access controls in place. Also both MAC addresses need to be accounted for in the same situation.

3-11-1-7 Wireless Network Configuration

The following procedure is used to configure the Voluson i / Voluson e system for a wireless network environment.

⚠ **NOTICE** To configure the Voluson i / Voluson e ultrasound unit to work with the WLAN adapter / WLAN Interface, the hospital´s network administrator must provide the required information.

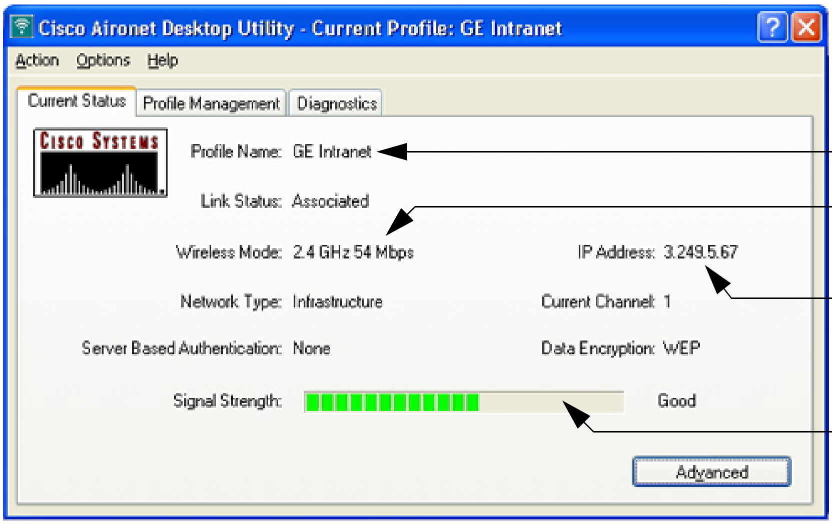
1.) Connect the Wireless Network adapter/ Wireless Network Interface as described in Section 3-5-4 on page 3-43.
2.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.
3.) Select SYSTEM and then open the NETWORK page on the System Setup desktop screen.
4.) Click the WLAN CONFIGURATION button.


General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Dicom
DICOM / Sonoview Configuration
DICOM Queue Status
Network
Network Configuration
Network Adapter Configuration
WLAN Configuration
Network Profiles
Exit
Save&Exit

[WLAN Configuration] button

Figure 3-128 WLAN Configuration

The **CURRENT STATUS** of the selected Profile is displayed, as shown in Figure 3-129 below.


Cisco Aironet Desktop Utility - Current Profile: GE Intranet
Action
Options
Help
Current Status
Profile Management
Diagnostics
CISCO SYSTEMS
Advanced

Profile Name: GE Intranet
Link Status: Associated
Wireless Mode: 2.4 GHz 54 Mbps
IP Address: 3.249.5.67
Network Type: Infrastructure
Current Channel: 1
Server Based Authentication: None
Data Encryption: WEP
Signal Strength: Good

NOTE: This example shows fictional information!

currently active profile

WLAN frequency

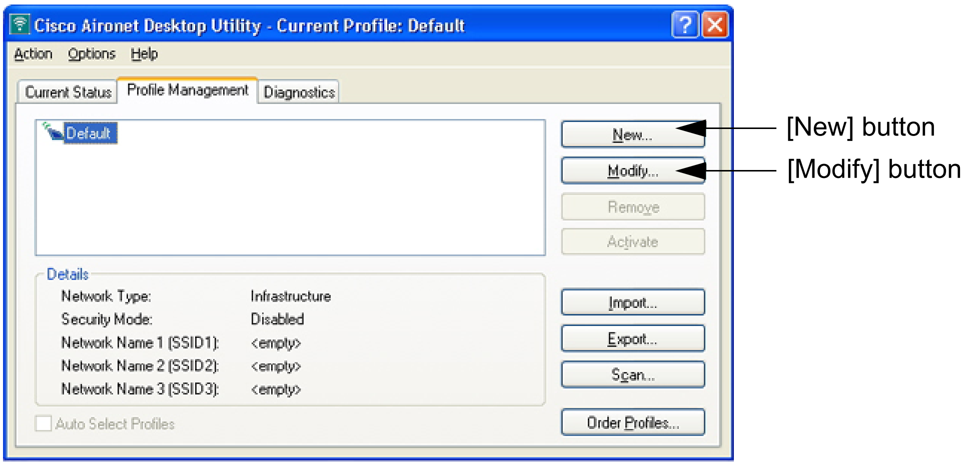
assigned IP address

current strength of the WLAN signal

Figure 3-129 Current Status

3-11-1-7 Wireless Network Configuration (cont'd)

5.) Select the **PROFILE MANAGEMENT** tab.



Cisco Aironet Desktop Utility - Current Profile: Default
Action
Options
Help
Current Status
Profile Management
Diagnostics
Default
New...
Modify...
Remove
Activate
Import...
Export...
Scan...
Order Profiles...
☐ Auto Select Profiles

Details

Network Type: Infrastructure
Security Mode: Disabled
Network Name 1 (SSID1): <empty>
Network Name 2 (SSID2): <empty>
Network Name 3 (SSID3): <empty>

[New] button

[Modify] button

Figure 3-130 Profile Management

6.) Click the NEW button to create a new, or the MODIFY button to modify the currently selected profile.

NOTE: *It is recommended to modify the "Default" profile.*

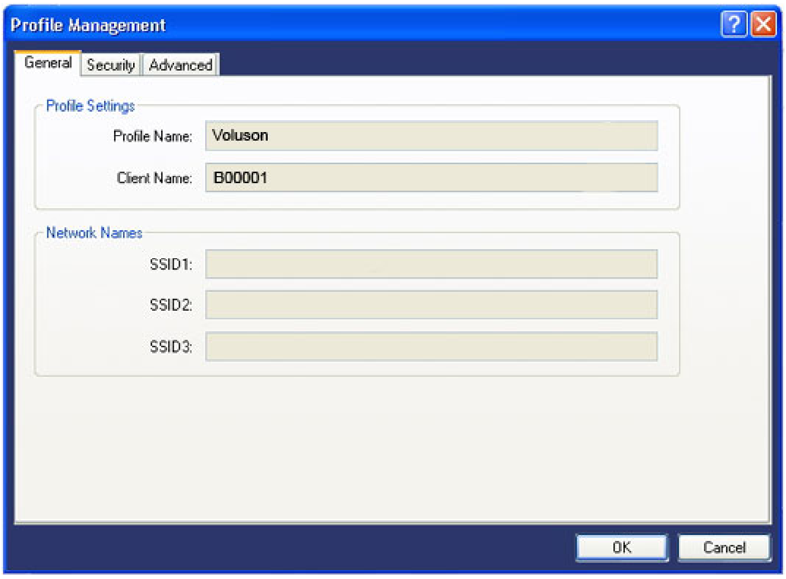
When you choose to create a NEW profile or MODIFY an existing profile, the Profile Management windows appear (e.g., *Figure 3-131: Profile Management - General on page 3-112*).
Each of these windows (listed below) enable you to set the configuration parameters for that profile.

General	Prepares the client adapter for use in a wireless network
Advanced	Controls how the client adapter operates within an infrastructure or ad hoc network
Security	Controls how a client adapter associates to an access point, authenticates to the wireless network, and encrypts and decrypts data

3-11-1-7-1 Setting General Parameters

The “Profile Management - General” window (see: Figure 3-131 below) enables you to set parameters that prepare the client adapter for use in a wireless network.
This window appears after you click NEW or MODIFY on the Profile Management (Figure 3-130 on page 3-111).

The “Profile Management - General” window appears on the screen, see: Figure 3-131 below.



Profile Name: Voluson
Client Name: B00001
SSID1:
SSID2:
SSID3:

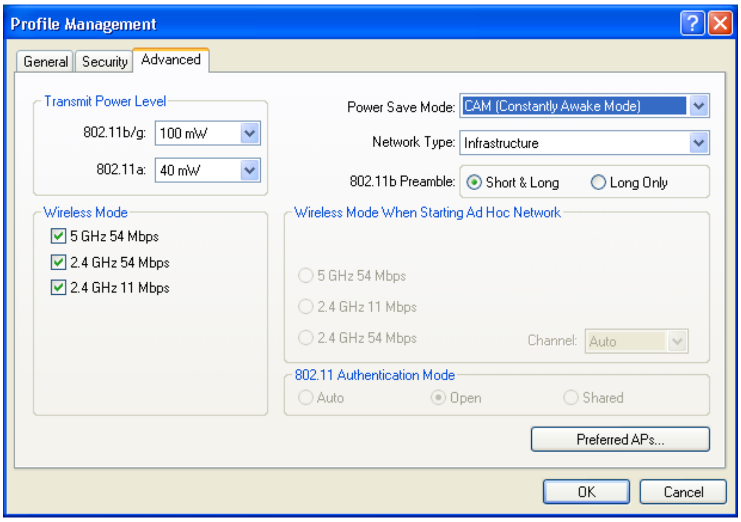
Figure 3-131 Profile Management - General

Table 3-19 Profile Management General Parameters

Parameter	Description
Profile Name	The name assigned to the configuration profile. **Type a suitable name for the new profile.** (As a recommendation, type Voluson).
Client Name	A logical name for your workstation. This name is included in the access point’s list of connected devices. **Default:** The client name (name of your computer = **system´s serial number** which is shown on the label on base of the Voluson i / Voluson e) is filled in automatically, but can be changed. **Note:** Each computer on the network should have a unique client name.
SSID1	The service set identifier (SSID) identifies the specific wireless network that you want the client adapter to access. **Type the Network Name as provided to you by the hospital´s Network Administrator.** **Note:** If you leave this parameter blank, your client adapter can associate to any access point on the network that is configured to allow broadcast SSIDs. If the access point with which the client adapter is to communicate is not configured to allow broadcast SSIDs, the value of this parameter must match the SSID of the access point. Otherwise, the client adapter is unable to access the network. **Note:** You must enter an SSID if this profile is configured for use in an ad hoc (*peer to peer*) network.
SSDI2/3	An optional SSID that identifies a second/third distinct network and enables the client adapter to roam to that network without having to be reconfigured. **Note:** If a profile specifies more than one SSID, it cannot be included in auto profile selection or used with WPA/WPA2 passphrase. **Note:** This field is unavailable for any profiles that are included in auto profile selection or configured for use in an ad hoc network.

3-11-1-7-2 Setting Advanced Parameters

The “Profile Management - Advanced” window (see: Figure 3-132 below) enables you to set parameters that control how the client adapter operates within an infrastructure or ad hoc network. To open this window, click the **ADVANCED** tab from any Profile Management window.



Transmit Power Level
802.11b/g: 100 mW
802.11a: 40 mW

Power Save Mode: CAM (Constantly Awake Mode)
Network Type: Infrastructure
802.11b Preamble: ● Short & Long ○ Long Only

Wireless Mode
☑ 5 GHz 54 Mbps
☑ 2.4 GHz 54 Mbps
☑ 2.4 GHz 11 Mbps

Wireless Mode When Starting Ad Hoc Network
○ 5 GHz 54 Mbps
○ 2.4 GHz 11 Mbps
○ 2.4 GHz 54 Mbps
Channel: Auto

802.11 Authentication Mode
○ Auto ● Open ○ Shared

Figure 3-132 Profile Management - Advanced

Table 3-20 Profile Management Advanced Parameters

Parameter	Description
Transmit Power Level	Specifies the preferred power level at which your client adapter transmits. Although the adapter supports up to 100 mW, the transmit power level that is actually used is limited to the maximum value allowed by country’s regulatory agency (FCC in the U.S., DOC in Canada, ETSI in Europe, TELEC in Japan, etc.). **Default:** The maximum power level programmed into the client adapter and allowed by your country’s regulatory agency. **Note:** Reducing the transmit power level conserves battery power but decreases radio range.
Power Save Mode	Sets your client adapter to its optimum power consumption setting. **Default:** CAM (Constantly Awake Mode) **CAM (Constantly Awake Mode):** Keeps the client adapter powered up continuously so there is little lag in message response time. Consumes the most power but offers the highest throughput. Is recommended for desktop computers and devices that use AC power. **Fast PSP (Power Save Mode):** Switches between PSP and CAM mode, depending on network traffic. Is recommended when power consumption is a concern but you need greater throughput than that allowed by Max PSP **Max PSP (Max Power Saving):** Conserves the most power but offers the lowest throughput. Is recommended for devices for which power consumption is the ultimate concern (such as small battery-powered devices). **Note:** If this profile is configured for use in an ad hoc network, CAM mode is used automatically.
Network Type	Specifies the type of network in which your client adapter is installed. **Default:** Infrastructure **Ad Hoc:** Often referred to as *peer to peer*. Indicates that your wireless network consists of a few wireless devices that are not connected to a wired Ethernet network through an access point. For example, an ad hoc network could be set up between computers in a conference room so that users can share information in a meeting. **Infrastructure:** Indicates that your wireless network is connected to a wired Ethernet network through an access point.
802.11b Preamble	Determines whether your client adapter uses both short & long radio headers or only long radio headers. Short radio headers improve throughput performance; long radio headers ensure compatibility with clients and access points that do not support short radio headers. **Default:** Short & Long

Table 3-21 Profile Management Advanced Parameters (cont´d)

Parameter	Description
Wireless Mode	Specifies the frequency and rate at which your client adapter should transmit packets to or receive packets from access points. **Default:** All options selected **Note:** When more than one option is selected, the client adapter attempts to use the wireless modes in this order: 5 GHz 54 Mbps, 2.4 GHz 54 Mbps, 2.4 GHz 11 Mbps. **Note:** Your client adapter's wireless mode must match that of the access points with which it is to communicate. Otherwise, your client adapter may not be able to associate to them
802.11 Authentication Mode	Specifies how your client adapter attempts to authenticate to an access point. **Default:** Open **Open:** Enables your client adapter, regardless of its WEP settings, to authenticate and attempt to communicate with an access point. However, communication can occur only if the adapter's WEP key matches that of the access point. **Note:** Cisco recommends that Auto and Shared not be used because they present a security risk.

3-11-1-7-3 Setting Security Parameters

The "Profile Management - Security" window (see: Figure 3-133 below) enables to set parameters that control how the client adapter associates to an access point, authenticates to the wireless network, and encrypts and decrypts data.

To access this window, click the **SECURITY** tab from any Profile Management window.

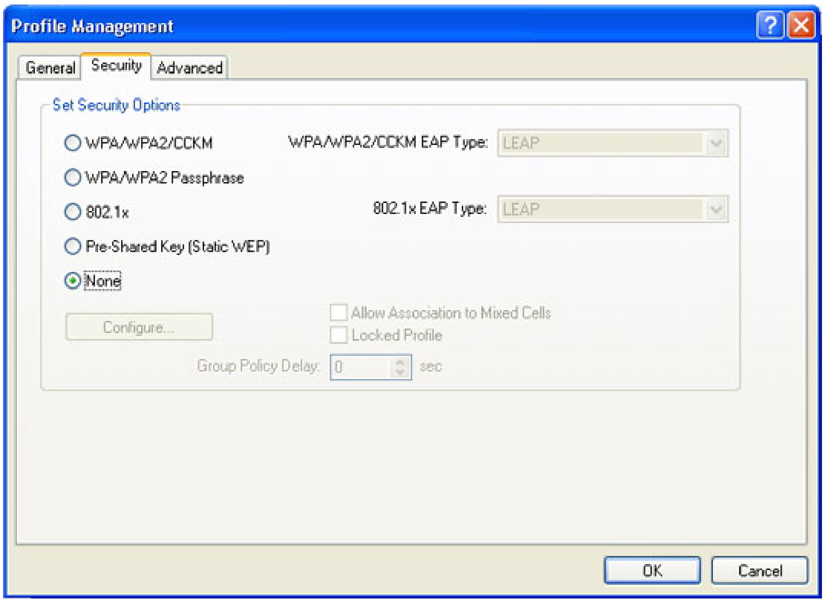

Profile Management
General
Security
Advanced
Set Security Options
○ WPA/WPA2/CCKM
WPA/WPA2/CCKM EAP Type: LEAP
○ WPA/WPA2 Passphrase
○ 802.1x
802.1x EAP Type: LEAP
○ Pre-Shared Key (Static WEP)
● None
Configure...
☐ Allow Association to Mixed Cells
☐ Locked Profile
Group Policy Delay: 0 sec
OK
Cancel

Figure 3-133 Profile Management - Security

This window includes many security features, each of which involves a number of steps.

You can protect your data as it is transmitted through your wireless network by encrypting it through the use of wired equivalent privacy (WEP) encryption keys. The security features themselves are complex and need to be understood before they are implemented.

CAUTION **WLAN security has to be adjusted to prevent viruses and to ensure data protection. Discuss settings with the hospital´s network administrator. He must provide the required information.**

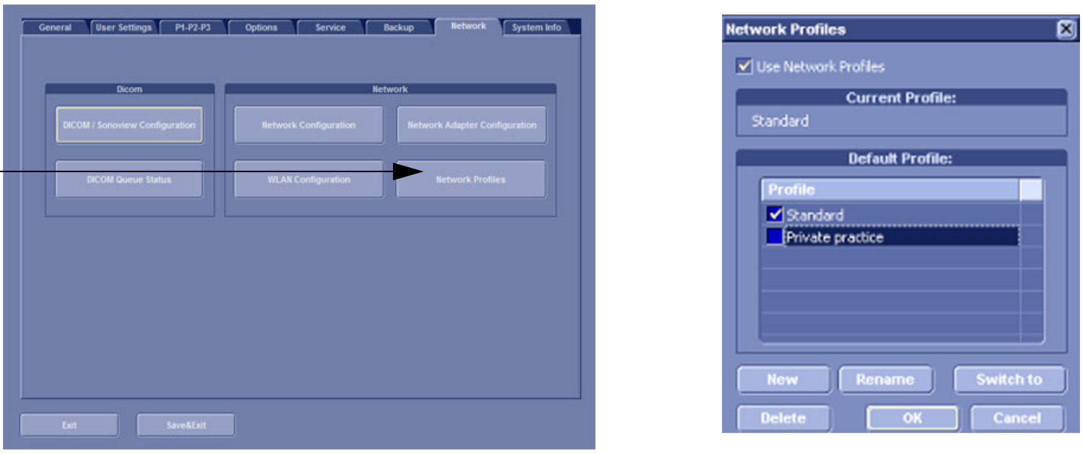
3-11-1-8 Network Profiles

1.) Connect the Wireless Network adapter as described in Section 3-5-4 on page 3-43 or connect the network cable.

2.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.

3.) Select SYSTEM and then open the NETWORK page on the System Setup desktop screen.

4.) Click the NETWORK PROFILES button.


General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Dicom
Network
DICOM / Sonoview Configuration
Network Configuration
Network Adapter Configuration
DICOM Queue Status
WLAN Configuration
Network Profiles
Exit
Save&Exit
Network Profiles
Default Profile:
Profile
New
Rename
Switch to
Delete
OK
Cancel

[Network Profiles] button

☑ Use Network Profiles

Current Profile: Standard

☑ Standard
☐ Private practice

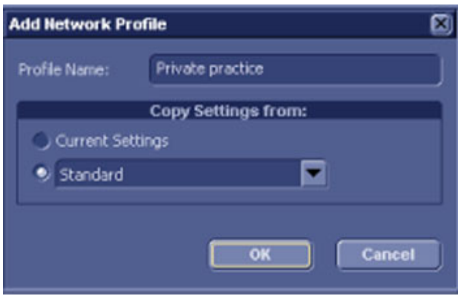
Figure 3-134 Network Profiles

5.) To start using Network Profiles, set the **Use Network Profiles** option in the upper section.

6.) The currenty used profile is displayed in the **Current Profile** textbox.

7.) In the **Default Profile** section click the checkbox next to the profile name which should be active from boot-up. If no default is set, the system requests the desired network profile everytime.

- Click the NEW button to set up a new profile.


Add Network Profile
OK
Cancel

Profile Name: Private practice

Copy Settings from:

○ Current Settings
● Standard

Figure 3-135 Add Network Profile

Specify a name for the Network Profile in the **Profile Name** textfield. There are two options:
* Current Settings: The current Network Setup of the system is stored in the Network Profile.
* The dropdown field lists all stored Network Profiles. Choose this option and the desired source profile to copy the settings to the new profile.
Click OK to save the Network Profile or click CANCEL to abort the operation.

- Click the RENAME button to rename the highlighted Network Profile.
- Click the SWITCH TO button to change the currently active network settings to the ones stored in the highlighted Network Profile.
- Click the DELETE button to delete the highlighted Network Profile.
- Click the OK button to confirm changes.
- Click the CANCEL button to abort the operation.

For more information follow the instructions in the Basic User Manual of the Voluson i / Voluson e.

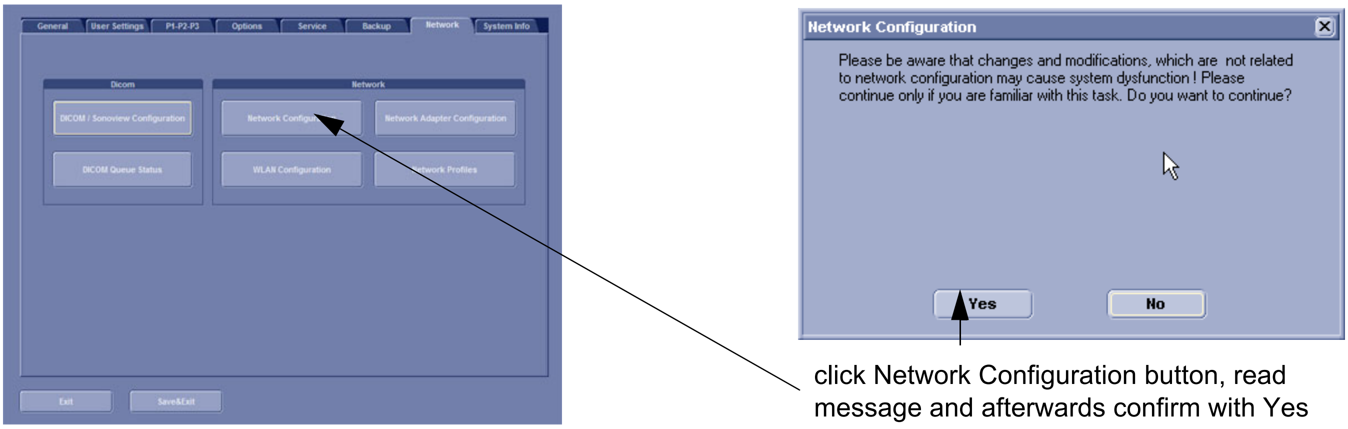
Section 3-12
Network IP Address Configuration

NOTE: *Following Information must be provided by customer or hospital engineer before you can start:*
A Station name, AE Title, IP address and Port Number for the Voluson i / Voluson e.
The IP addresses for the default gateway and other routers at the site for ROUTING INFORMATION.
Only if necessary (e.g. for Internet access).

NOTE: *If the Voluson i/e is connected to the Voluson Station this procedure programs the LAN Connector in the Voluson Station otherwise the LAN connector in the Voluson i / Voluson e.*

3-12-1 Network Configuration

1.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.
2.) Select SYSTEM and then open the NETWORK page on the System Setup desktop screen.
3.) Click the NETWORK CONFIGURATION button, read the message and confirm with YES.

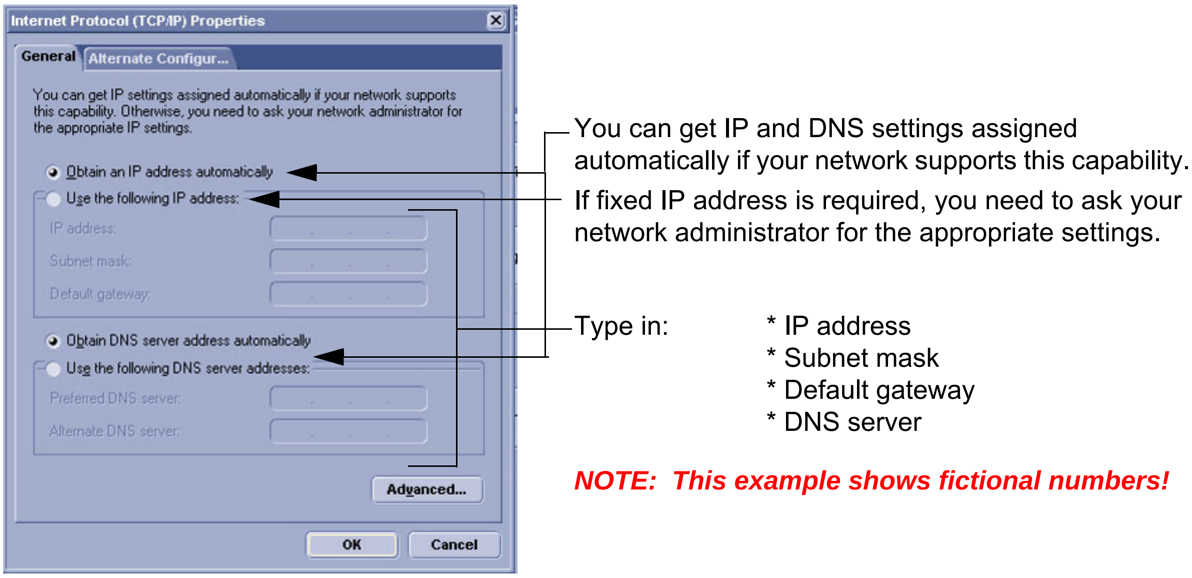

General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Dicom
Network
DICOM / Sonoview Configuration
Network Configu
Network Adapter Configuration
DICOM Queue Status
WLAN Configuration
Network Profiles
Exit
Save&Exit
Network Configuration
Yes
No

Please be aware that changes and modifications, which are not related to network configuration may cause system dysfunction ! Please continue only if you are familiar with this task. Do you want to continue?

click Network Configuration button, read message and afterwards confirm with Yes

Figure 3-136 Network Configuration

4.) The “Internet Protocol (TCP/IP) Properties” dialog page appears.


Internet Protocol (TCP/IP) Properties
General
Alternate Configur...
Advanced...
OK
Cancel

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically
○ Use the following IP address:
IP address: . . .
Subnet mask: . . .
Default gateway: . . .

● Obtain DNS server address automatically
○ Use the following DNS server addresses:
Preferred DNS server: . . .
Alternate DNS server: . . .

You can get IP and DNS settings assigned automatically if your network supports this capability.

If fixed IP address is required, you need to ask your network administrator for the appropriate settings.

Type in:
* IP address
* Subnet mask
* Default gateway
* DNS server

NOTE: This example shows fictional numbers!

Figure 3-137 Internet Protocol (TCP/IP)

To specify a DICOM® Address, follow the instructions in the Basic User Manual of the Voluson i/e.

3-12-2 Dicom®/SonoView Configuration

DICOM® is the abbreviation of Digital Imaging and Commnications in Medicine. This is the industrial standard for communication of images and other information between medical devices on the network. Using the DICOM® option, you can send or print images after connecting your ultrasound equipment and PACS.
This dialog section is used to set up details of all of your DICOM® target nodes (image servers). Once you have set up a DICOM® node properly, data can simply be transmitted by selecting the appropriate target node.

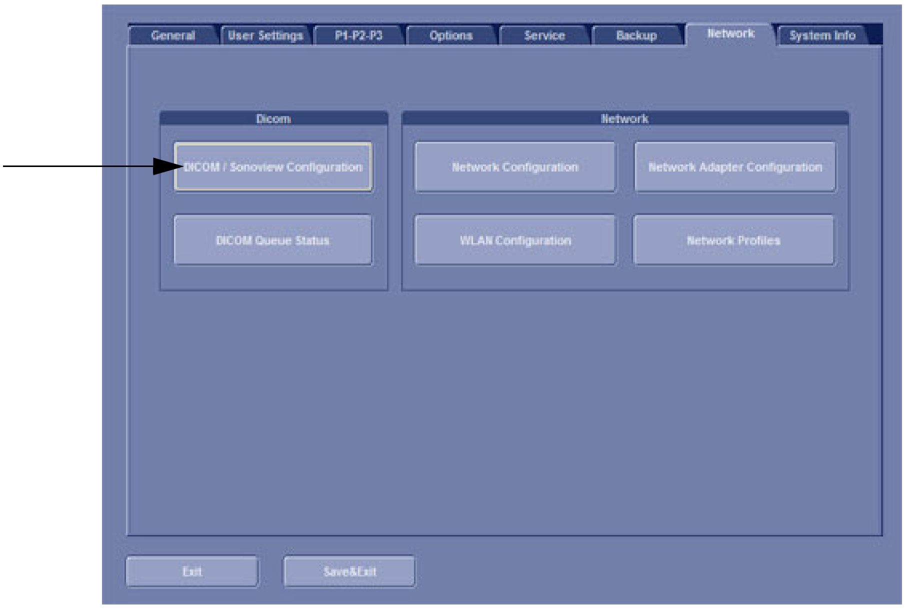

General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Dicom
DICOM / Sonoview Configuration
DICOM Queue Status
Network
Network Configuration
Network Adapter Configuration
WLAN Configuration
Network Profiles
Exit
Save&Exit

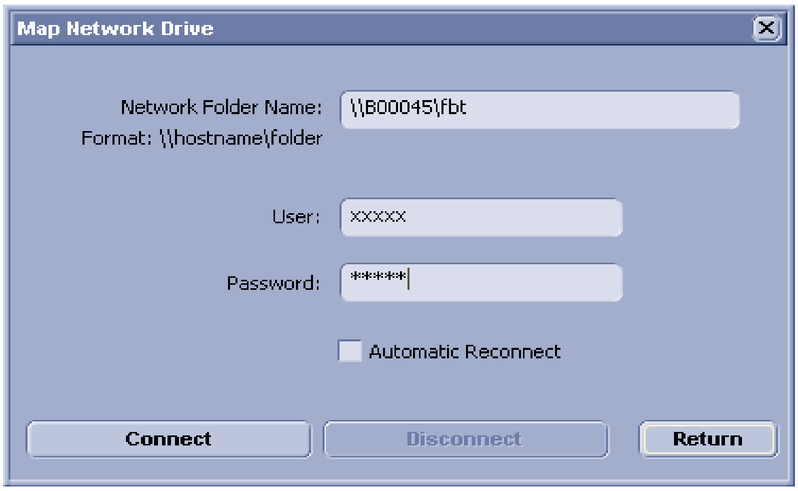
Figure 3-138 Dicom® / SonoView Configuration

For more information follow the instructions in the Basic User Manual of the Voluson i / Voluson e.

3-12-3 Map Network Drive

Press the **USB** key on the keyboard, the “Connect USB and Network Drives” dialog window (see: Figure 3-56 on page 3-44) is displayed.

1.) Select the MAP NETWORK DRIVE button to open a dialog where the system can be connected to a shared network drive of another server.



Network Folder Name: \\B00045\fbt
Format: \\hostname\folder

User: xxxxx

Password: ******

☐ Automatic Reconnect

Figure 3-139 Map Network Drive window

2.) Enter the name of the shared network folder in the „Network Folder Name“ field.

3.) Supply a valid user name and a password for this folder.

NOTE: If you check the „Automatic Reconnect“ box, the system tries to establish the connection again when starting up.
Otherwise, the connection must be re-established manually after a shutdown or reboot.

4.) Select the CONNECT button to establish the connection to the remote machine.
If successful, the DISCONNECT button becomes active.

NOTICE If there is an error during the connection, a warning message appears inside the dialog.
In this case, please verify the data in the dialog.

NOTICE If there already is a connection to the remote server, the CONNECT button is grayed.
To change the existing connection, first click on DISCONNECT and then enter the new settings.

WARNING ***Please make sure that the server you are connecting to is trustworthy and reliable.***
For details, contact your local system administrator.
If you backup Sonoview data to this server, all the patients’ demographic data will be copied to this server!

Section 3-13
Connectivity Setup Worksheet

Site System Information

Site:
Dept:
Voluson i/eSN: Type:

Floor:
Room:
REV:

Comments:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

System IP Settings

Name - AE Title:
IP Address:
Subnet Mask:
Default Gateway:

Remote Archive Setup

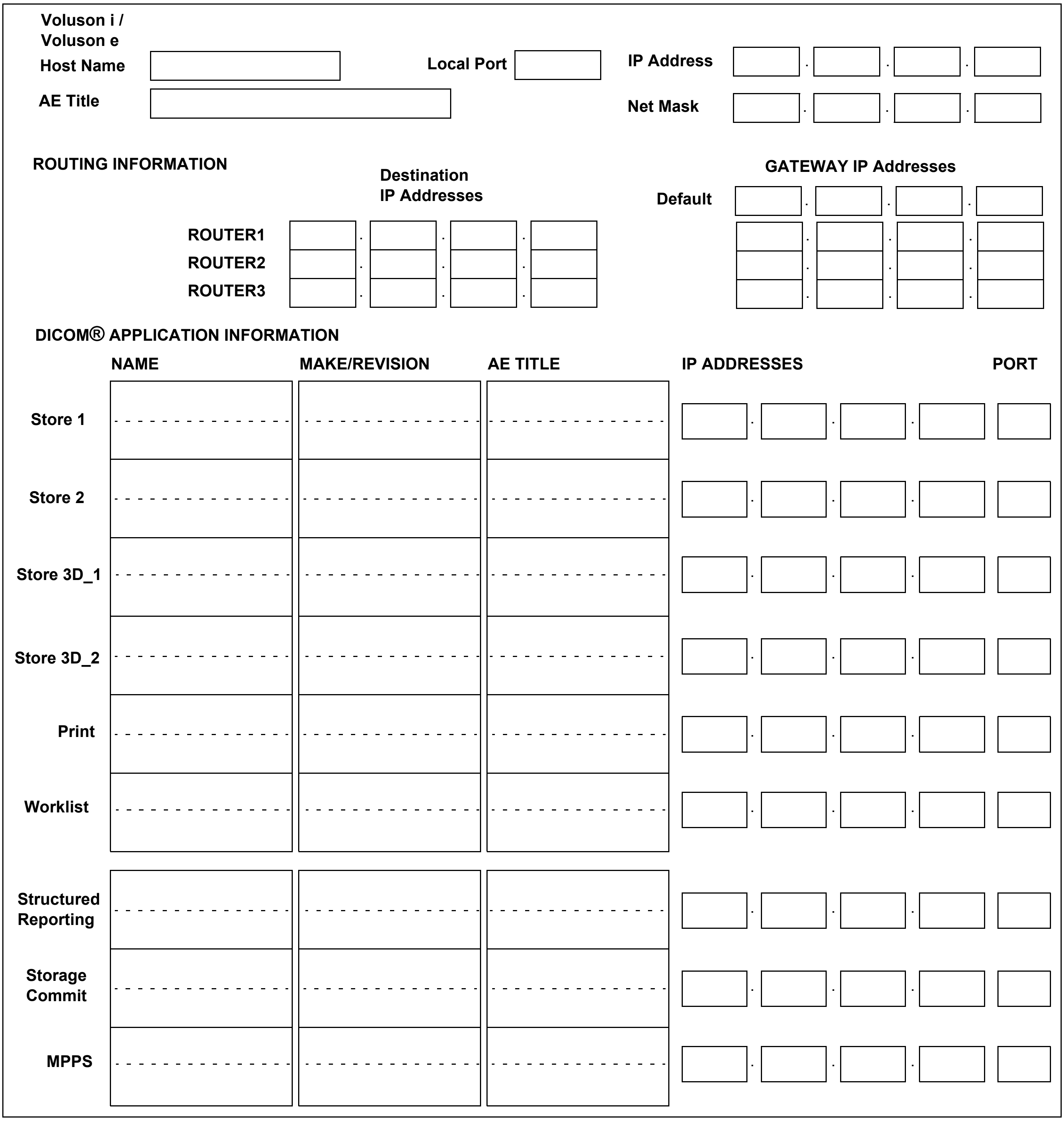
Name - AE Title:
IP Address:
Subnet Mask:
Default Gateway:
Server Name:
Remote DB User Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address				Port	AE Title
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Figure 3-140 Connectivity Installation Worksheet

Section 3-13 Connectivity Setup Worksheet (cont'd)



Voluson i / Voluson e

Host Name

Local Port

IP Address . . .

AE Title

Net Mask . . .

ROUTING INFORMATION

Destination IP Addresses

GATEWAY IP Addresses

Default . . .

ROUTER1 . . .

ROUTER2 . . .

ROUTER3 . . .

DICOM® APPLICATION INFORMATION

	NAME	MAKE/REVISION	AE TITLE	IP ADDRESSES	PORT
Store 1				. . .	
Store 2				. . .	
Store 3D_1				. . .	
Store 3D_2				. . .	
Print				. . .	
Worklist				. . .	
Structured Reporting				. . .	
Storage Commit				. . .	
MPPS				. . .	

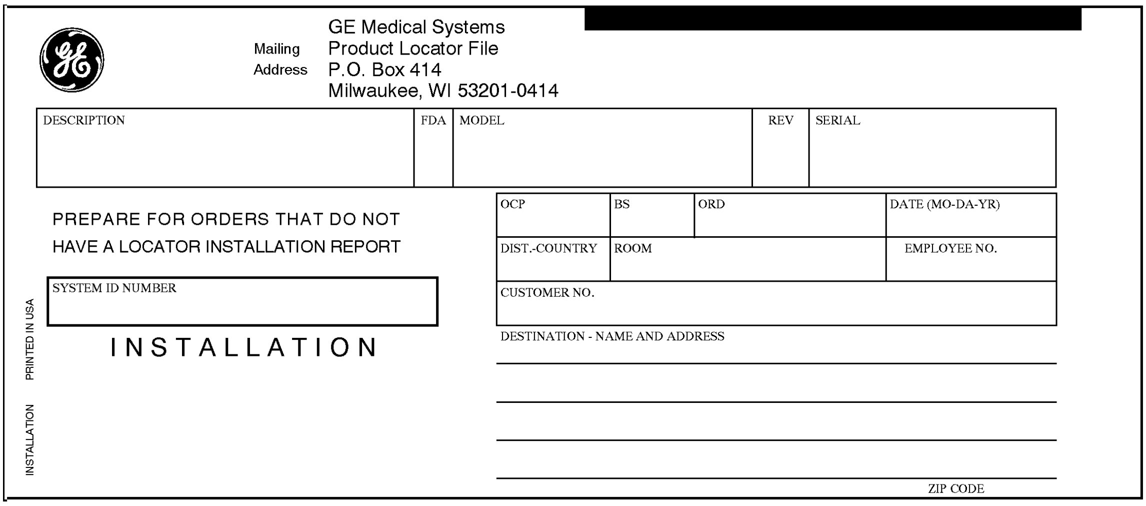
Figure 3-141 Worksheet for DICOM® Network Information

Section 3-14
Paperwork

NOTE: During and after installation, the documentation (i.e. User Manual, Installation Manual,...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

3-14-1 Product Locator Installation

NOTE: The Product Locator Installation Card shown may not be same as the provided Product Locator card.



Mailing Address
GE Medical Systems
Product Locator File
P.O. Box 414
Milwaukee, WI 53201-0414

DESCRIPTION	FDA	MODEL	REV	SERIAL

PREPARE FOR ORDERS THAT DO NOT HAVE A LOCATOR INSTALLATION REPORT

SYSTEM ID NUMBER

INSTALLATION

OCP	BS	ORD	DATE (MO-DA-YR)
DIST.-COUNTRY	ROOM		EMPLOYEE NO.
CUSTOMER NO.			

DESTINATION - NAME AND ADDRESS

ZIP CODE

PRINTED IN USA

INSTALLATION

Figure 3-1 Product Locator Installation Card

3-14-2 User Manual(s)

Check that the correct User Manual(s) for the system and software revision, is included with the installation. Specific language versions of the User Manual may also be available.
Check with your GE Sales Representative for availability.

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Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter provides procedures for quickly checking major functions of the Voluson i / Voluson e scanner diagnostics by using the built-in service software, and power supply adjustments.

Table 4-1 Contents in Chapter 4

Section	Description	Page Number
4-1	Overview	4-1
4-2	Required Equipment	4-1
4-3	General Procedure	4-1
4-4	Functional Checks	4-5
4-5	Backup and Restore Database, Preset Configurations and Images	4-28
4-6	Software Configuration Checks	4-38
4-7	Peripheral Checks	4-39
4-8	Site Log	4-40

NOTICE Most of the information pertaining to this Functional Checks chapter is found in the Voluson i / Voluson e Basic User Manual; Table 9-26, “System Manuals - Voluson i,” on page 9-44 and Table 9-27, “System Manuals - Voluson e,” on page 9-46.

Section 4-2
Required Equipment

- An empty (blank) DVD/CD+(R)W.
- At least one transducer. See ”*Probes” on page 9-50* for an overview.
  (normally you should check all the transducers used on the system)

Section 4-3
General Procedure

CAUTION **SYSTEM REQUIRES ALL COVERS**
Operate this unit only when all board covers and frame panels are securely in place.
The covers are required for safe operation, good system performance and cooling purposes.

NOTICE Lockout/Tagout Requirements (For USA only)
Follow OSHA Lockout/Tagout requirements by ensuring you are in total control of the Power Cable on the system.

TAG
&
LOCKOUT

4-3-1 System Features

4-3-1-1 Control Panel

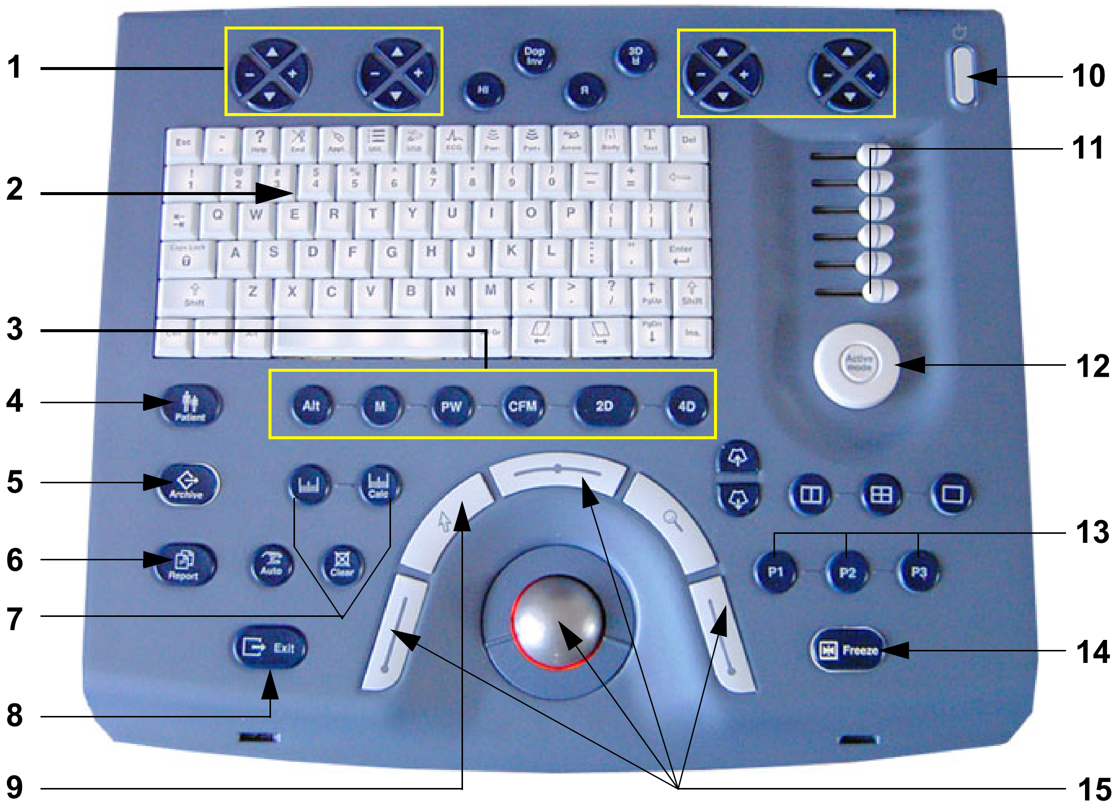

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Dop Inv
3D
HI
R
Patient
Archive
Report
Auto
Clear
Calc
Exit
Alt
M
PW
CFM
2D
4D
Active mode
P1
P2
P3
Freeze

Figure 4-1 Control Panel of the Voluson i / Voluson e

1	Menu Control keys (Soft-menu buttons)	10	ON/OFF Switch
2	alphanumeric keyboard with main function keys (e.g., Utilities, Bodymarks, Power up/down, etc.)	11	TGC - Slider Controls
3	Mode keys	12	Gain key for Active mode
4	Patient Data Entry key	13	Inter memory keys to print, save to Sonoview or send to DICOM® server
5	Image Management (Sonoview) key	14	Freeze / Run key
6	Patient Report key	15	Trackball and Trackball keys
7	Measurement keys		
8	Exit key		
9	Menu Pointer [Cursor] key		

4-3-1-2 Menu Control

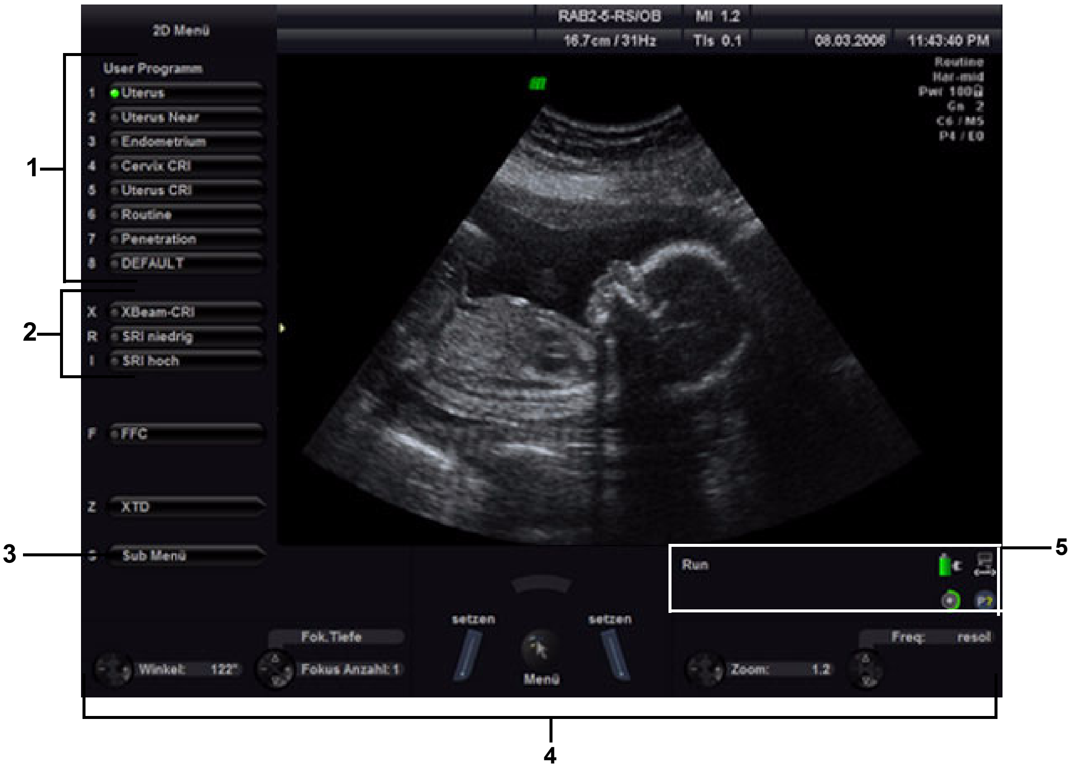

2D Menü
User Programm
1 Uterus
2 Uterus Near
3 Endometrium
4 Cervix CRI
5 Uterus CRI
6 Routine
7 Penetration
8 DEFAULT
X XBeam-CRI
R SRI niedrig
I SRI hoch
F FFC
Z XTD
Sub Menü
RAB2-5-RS/OB
MI 1.2
16.7cm / 31Hz
TIs 0.1
08.03.2006
11:43:40 PM
Routine
Har-mid
Pwr 100
Gn 2
C6 / M5
P4 / E0
Run
P?
setzen
setzen
Menü
Fok.Tiefe
Winkel: 122°
Fokus Anzahl: 1
Zoom: 1.2
Freq: resol
1
2
3
4
5

Figure 4-2 Menu Control Area - 2D Main Menu

1.) User Program: shows all setting for the active application. The active one is highlighted
2.) Additional functions which are supported by the selected Scan mode.
3.) Sub Menu: to adjust settings of the selected “Main” mode.
4.) Status Area: shows the current functionality of the Trackball, the Trackball keys and the Soft-menu buttons.
5.) Area indicates operation state, shows current battery status and function of **P?** Printer buttons.

NOTE: Different menus are displayed depending on which Menu and which Mode is selected.

SOFT- BUTTONS, TRACKBALL and Trackball KEYS

Currently activated functions are displayed in the status area by their location, their function and their actual value of setting. They are easily controlled by moving the trackball, pressing the trackball keys or switching the corresponding Soft-menu button.

FUNCTION KEYS located on the alphanumeric Keyboard

Many main functions (e.g., Utilities, Bodymarks, Power up/down, etc.) are activated by pressing its specific key on the alphanumeric keyboard.

KEYBOARD-SHORTCUT FUNCTIONS

Available menus are shown in the menu area on the left side of the screen. The current menu selection is highlighted. If not active (key is illuminated), press the **MENU POINTER** [Cursor] key nearby the trackball. Now move the cursor to another item in the menu area and then press **SET** (the left or right trackball key) to select and start the desired function.
Alternatively, press the keyboard shortcut (1, 2, 3, etc.) which is shown on the left of the actual item.

4-3-1-3 Monitor Display

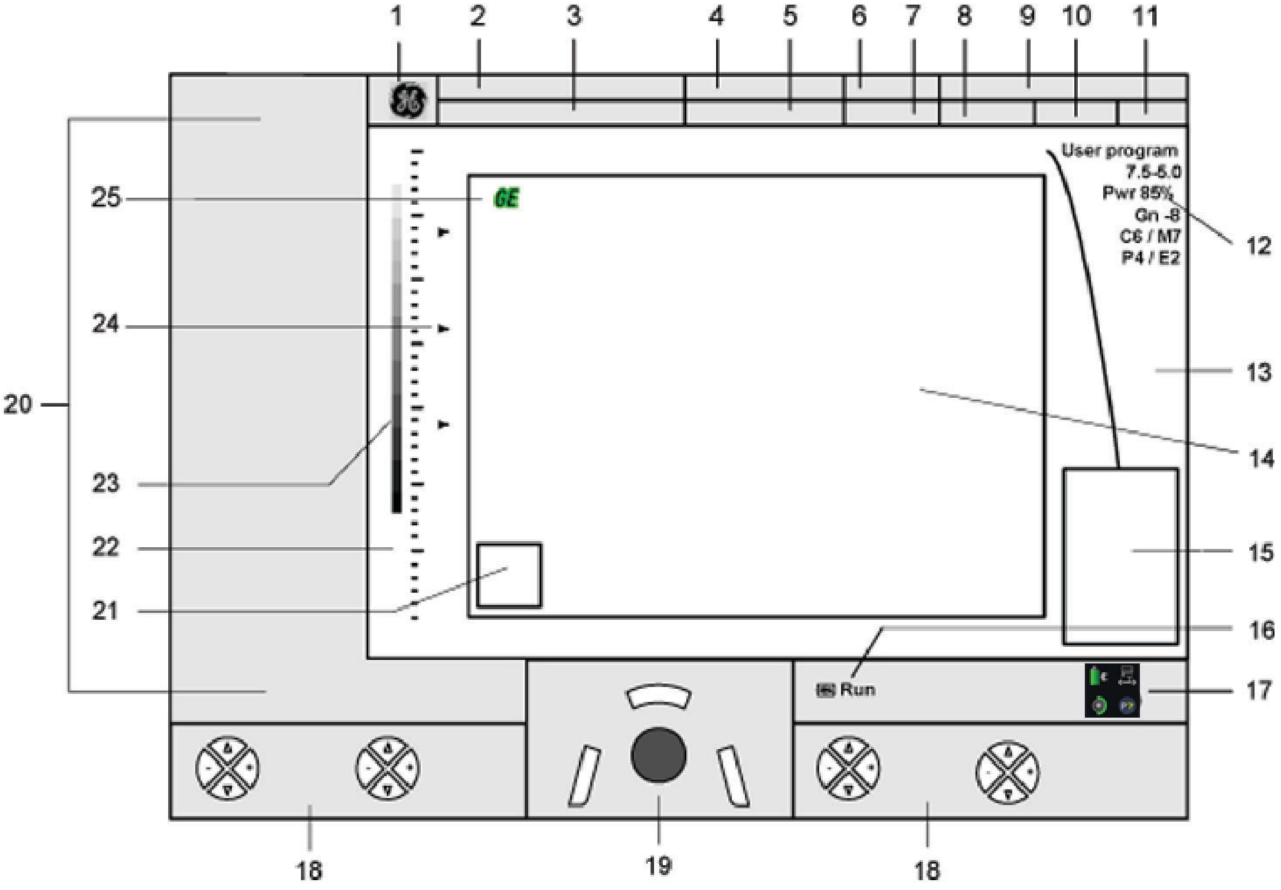

1
2
3
4
5
6
7
8
9
10
11
GE
User program
7.5-5.0
Pwr 85%
Gn -8
C6 / M7
P4 / E2
12
25
24
20
23
22
21
13
14
15
16
Run
17
18
19
18

Figure 4-3 Monitor Display Tour

Table 4-2 Monitor Display Features

1. Logo	14. Image Area
2. Patient Name (Last-, First-, Middle Name)	15. Measurement results
3. Patient ID-number ; GA (Gestational Age)	16. Status area indicates current operation state
4. Probe / Application	17. Status area of Battery, Docking icon, Remote Service icon and **P1**, **P2** and **P3** keys,
5. Depth / Frame rate	18. Status area of Soft-menu buttons
6. Mechanical Index	19. Status area of the trackball and trackball keys
7. Thermal Index	20. Menu (Softkey) area
8. Sonographers Name	21. Bodymarks
9. Hospital Name (Identification)	22. Depth scale markers
10. Date	23. Gray scale wedge
11. Time	24. Focal zone marker(s)
12. Image Info	25. Orientation marker
13. TGC curve	

Section 4-4
Functional Checks

For a basic functional check of the system's different modes, following pages will familiarize you with image optimization for:

- 2D Mode (B Mode)
- M Mode
    - MCFM Mode
- Spectral Doppler Modes
    - PW - Pulsed Wave Doppler
- Color Doppler Modes
    - CFM - Color Flow Mode
    - PD - Power Doppler
- Volume Modes
    - 3D Static
    - 4D Real Time (Classic / Smart)
    - TUI* (Tomographic Ultrasound Imaging)
    - VOCAL*
    - RT 4D Biopsy*
    - XTD View
    - VCI - Volume Contrast Imaging*
    - SonoAVC
    - SonoVCAD heart*
    - SonoVCAD labor
    - STIC*
    - SonoNT
    - Sono Render Start

BT Version: The options “RT 4D Biopsy”, “VCI” and “XTD-View” are only applicable at Voluson i / Voluson e systems with BT’07 software and higher.

BT Version: The options “SonoAVC”, SonoVCAD” and “STIC” are only applicable at Voluson i / Voluson e systems with BT’09 software.

BT Version: The options “SonoNT” and “SonoRS” are only applicable at Voluson i / Voluson e systems with BT’11 software.

NOTICE Not all Options are available on the **Voluson e** (marked with ***** in this manual)

NOTE: *Some software may be considered standard depending upon system configuration.*
If any Modes or Options are not part of the system configuration, the check can be omitted.

NOTE: *Different menus are displayed depending on which Menu and which Mode is selected.*
Some function only appear in the menu area and the status area of the Trackball, the Trackball keys and the Soft-menu buttons if they are available for the selected probe.

4-4-1 2D Mode Checks

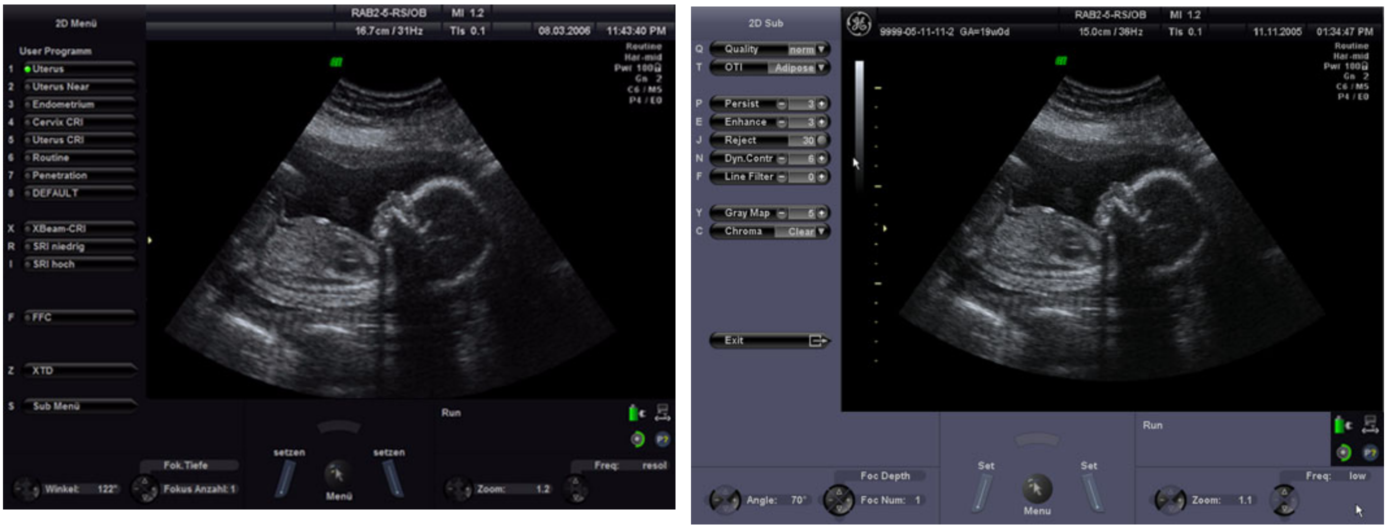

2D Menü
User Programm
1 Uterus
2 Uterus Near
3 Endometrium
4 Cervix CRI
5 Uterus CRI
6 Routine
7 Penetration
8 DEFAULT
X XBeam-CRI
R SRI niedrig
I SRI hoch
F FFC
Z XTD
S Sub Menü
RAB2-5-RS/OB
MI 1.2
16.7cm / 31Hz
TIs 0.1
08.03.2006
11:43:40 PM
Routine
Har-mid
Pwr 100
Gn 2
C6 / M5
P4 / E0
Run
setzen
setzen
Menü
Fok.Tiefe
Winkel: 122°
Fokus Anzahl: 1
Zoom: 1.2
Freq: resol
2D Sub
Q Quality norm
T OTI Adipose
P Persist 3
E Enhance 3
J Reject 30
N Dyn.Contr 6
F Line Filter 0
Y Gray Map 5
C Chroma Clear
Exit
9999-05-11-11-2 GA=19w0d
RAB2-5-RS/OB
MI 1.2
15.0cm / 36Hz
TIs 0.1
11.11.2005
01:34:47 PM
Routine
Har-mid
Pwr 100
Gn 2
C6 / M5
P4 / E0
Run
Set
Set
Menu
Foc Depth
Angle: 70°
Foc Num: 1
Zoom: 1.1
Freq: low

Figure 4-4 2D Main and 2D Sub

Table 4-3 2D Mode Functions

Step	Task	Expected Results
1	2D Mode Gain	Rotate the ACTIVE MODE rotary control to adjust the sensitivity (brightness) of the entire image.
2	Transmit Power - Pwr Pwr +	Optimizes image quality and allows user to reduce/increase beam intensity.
3	Penetration Depth ↑ ↓	Adjusts the depth range of the ultrasound image for the region of interest. The number of image lines and the frame rate are automatically optimized.
4	Screen Format (Dual, Quad, Single) ◫ ⊞ ☐	Press this keys to change the display Mode from Single to **DUAL** or **QUAD** display mode. Press the **SINGLE** format key or the **2D MODE** key to change from Dual or Quad to Single display.
5	Image Orientation (left/right, up/down) Я 3D ᴚ	Use these keys on the control panel to alternate the image orientation. The orientation marker on the screen shows the actual orientation.
6	2D Automatic Optimization Auto	Pressing the **AUTO** key causes automatic optimization of the gray scale to enhance the contrast resolution. Pressing again: optimization will be updated and remain active. Press the **AUTO** key twice to switch off the Automatic Optimization in 2D.
7	XBEAM CRI (CrossBeam Compound Resolution Imaging)	Pulses are transmitted not only perpendicularly to the acoustic window, but also in oblique directions. The advantages of XBeam CRI are enhanced contrast resolution with better tissue differentiation and clear organ borders.

Table 4-3 2D Mode Functions

Step	Task	Expected Results
8	**ß-VIEW** ⇨ **BT Version:**	This function allows the adjustment of the Volume O-Axis position of 3D probes in 2D Mode. The green line in the displayed symbol indicates the position of the acoustic block. This feature is only available at systems with **BT´07** software and higher.
9	SRI LOW / SRI HIGH (Speckle Reduction Imaging)	Speckle Reduction Imaging is a smoothing type filter to reduce speckle in the ultrasound image.
10	2D+2D/XXX	Changes the Single image display to two simultaneous half images. The left frame shows only the 2D Mode image. The right frame shows the 2D Mode image with xxx (xxx = SRI or CRI) information.
11	FFC (Focus and Frequency Composite)	FFC combines a low frequency to increase the penetration and higher frequency to keep a high resolution. It reduces speckle and artifacts in the 2D image.
12	LINEAR / TRAPEZOID	Advantage of the Trapezoid Mode: The scan area is very increased in relation to the linear display by steering the ultrasound lines in the border of the probe.
13	High Resolution Zoom	Press the **MAGNIFY GLASS** key (nearby the trackball) in write mode. The displayed zoom box can be placed over the entire 2D image area, also the size and position of the zoom box can be changed. Press the **MAGNIFY GLASS** key again to activate the zoom and again to exit the High Resolution Zoom function.
14	Harmonic Imaging HI	Press the **HI** key on the control panel to switch on/off the Coded Harmonic Imaging function in 2D Mode provided the active probe allows this function.
15	ANGLE	Press the Soft-menu buttons to select a part of interest of the 2D image. The advantage of the decreased field-of-view is an increased 2D frame rate due to the smaller sector width.
16	FOC DEPTH	Press the Soft-menu buttons to select the depth position of the actual focus zone(s). Arrows at the left edge of the 2D image mark the active focal zone(s) by their depth position.
17	FOC NUM:	Pressing the Soft-menu buttons increases the number of transmit focal zone, so that you can tighten up the beam for a specific area.
18	ZOOM	Press the Soft-menu buttons for Image magnification (Pan Zoom) in read and write mode.
19	FREQ: Resol. HARM.FREQ. in case of Harm. Imaging	Press the Soft-menu buttons to adjust the range of the receive frequency; high resolution/lower penetration, mid resolution/mid penetration, or lower resolution/high penetration
20	QUALITY	Control to improve the resolution by reducing the frame rate. Respectively reducing the resolution by increasing the image frame rate.
21	OTI (Otimized Tissue Imaging)	OTI™ allows to “fine tune” the system for scanning different kinds of tissue.
22	PERSIST	Persistence is a temporal filter that averages frames together. This has the effect of presenting a smoother, softer image.
23	ENHANCE	Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M Mode's edge enhancement affects the M Mode only.
24	REJECT	Selects a level below which echoes will not be amplified (an echo must have a certain minimum amplitude before it will be processed).

Table 4-3 2D Mode Functions

Step	Task	Expected Results
25	DYN CONTR	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast.
26	LINE FILTER	The signals of the neighboring pulses are less weighted for the display of the actual pulse which considerably improves the detail lateral resolution and signal-to-noise ratio.
27	GRAY MAP	A gray map determines the displayed Brightness of an echo in relationship to its amplitude.
28	CHROMA	This defines the relation between echo amplitude (input) and Chroma value (color tone and saturation) in a look-up table.
29	**EXIT**	Press the **EXIT** key on the control panel to exit the 2D Sub menu.
30	**XTD -VIEW** ⇨ **BT Version:**	XTD-View (Extended View) On/Off Select **XTD** to activate/deactivate the XTD-View mode. A box is displayed at the border of the 2D image. This feature is only available at systems with **BT´07** software and higher.

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter “2D Mode”.

4-4-2 M Mode Checks

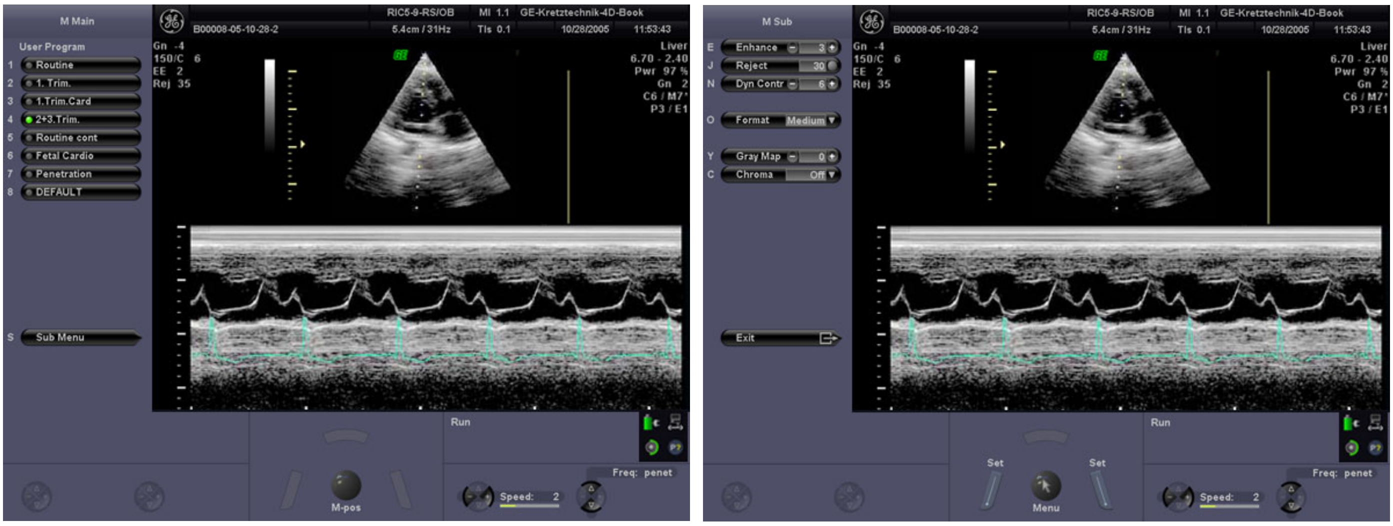

M Main
User Program
Routine
1. Trim.
1.Trim.Card
2+3.Trim.
Routine cont
Fetal Cardio
Penetration
DEFAULT
Sub Menu
M-pos
Run
Speed: 2
Freq: penet
M Sub
Enhance 3
Reject 30
Dyn Contr 6
Format Medium
Gray Map 0
Chroma Off
Exit
Set
Menu

Figure 4-5 M Main and M Sub

Table 4-4 M Mode Functions

Step	Task	Expected Results
1	Cursor Position	Adjust the M Cursor position with the **TRACKBALL** in the 2D Single image.
2	Activation of M Mode	Press the **right or left trackball key** to activate both Modes (2D/M).
3	M Mode Gain	Rotate the **ACTIVE MODE** rotary control to adjust the sensitivity (brightness) of the entire M image.
4	M Mode Penetration **DEPTH**	Directly Associated with 2D Mode Penetration Depth.
5	M Mode Trace Invert Dop Inv	Press the **DOP INV** key on the control panel to invert the M mode trace from up to down in the M mode display area. (The Invert function is only available with endovaginal probes.)
6	SPEED	Press the Soft-menu buttons to select different sweep speeds.
7	FREQ:	Common with 2D Mode Freq: Resol. Harm.Freq. in case of Harm. Imaging.
8	ENHANCE	Due to this function a finer, sharper impression of the image is produced.
9	REJECT	It determines the amplitude-level below which echoes are not displayed (rejected).
10	DYN CONTR	Dynamic enhances a part of the grayscale to make it easier to display pathology.
11	FORMAT	For selection of three different changes the display of the ratio between the grayscale image and M-Mode spectrum.
12	GRAY MAP	A gray map determines the displayed Brightness of an echo in relationship to its amplitude.
13	CHROMA	This defines the relation between echo amplitude (input) and Chroma value (color tone and saturation) in a look-up table.
14	**EXIT**	Press the **EXIT** key on the control panel to exit the M Sub menu.

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter “M Mode”.

4-4-2-1 MCFM Mode Check

By pressing the **M** control and the **CFM** control, the MCFM mode is switched on in preparation mode. The M-cursor with M-Color window appears in the active 2D image.

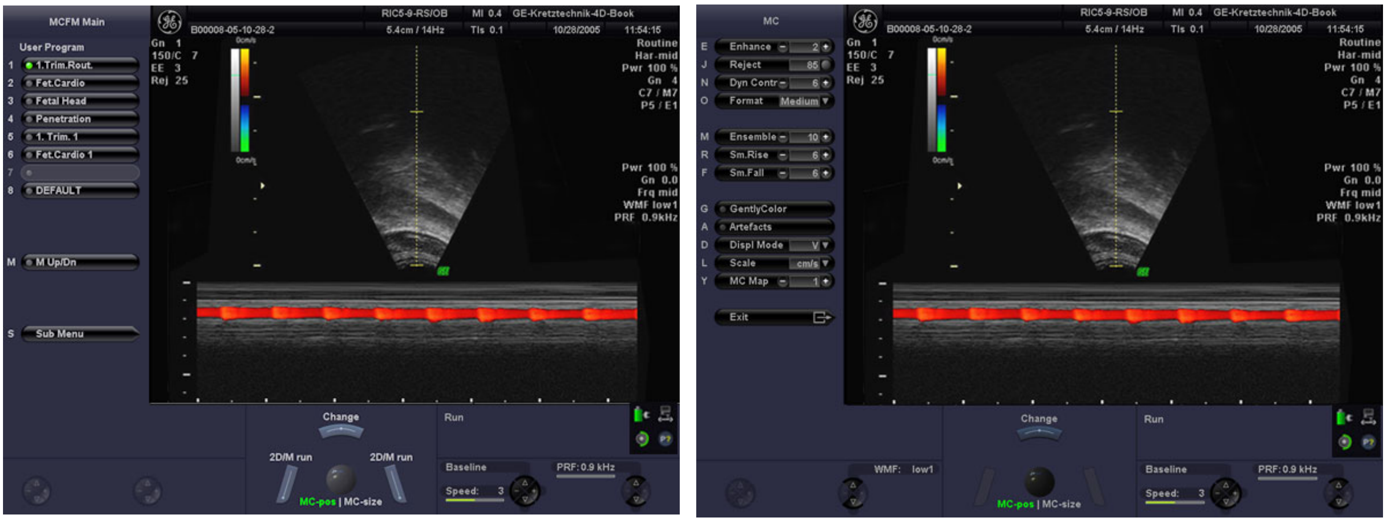

MCFM Main
User Program
1 1.Trim.Rout.
2 Fet.Cardio
3 Fetal Head
4 Penetration
5 1. Trim. 1
6 Fet.Cardio 1
7
8 DEFAULT
M M Up/Dn
S Sub Menu
Change
2D/M run
2D/M run
MC-pos | MC-size
Run
Baseline
Speed: 3
PRF: 0.9 kHz
MC
E Enhance 2
J Reject 85
N Dyn Contr 6
O Format Medium
M Ensemble 10
R Sm.Rise 6
F Sm.Fall 6
G GentlyColor
A Artefacts
D Displ Mode V
L Scale cm/s
Y MC Map 1
Exit
WMF: low1

Figure 4-6 MCFM Main and MCFM Sub Menu

For further details refer to the Voluson i / Voluson e Basic User Manual.

4-4-3 Spectral Doppler Mode Checks

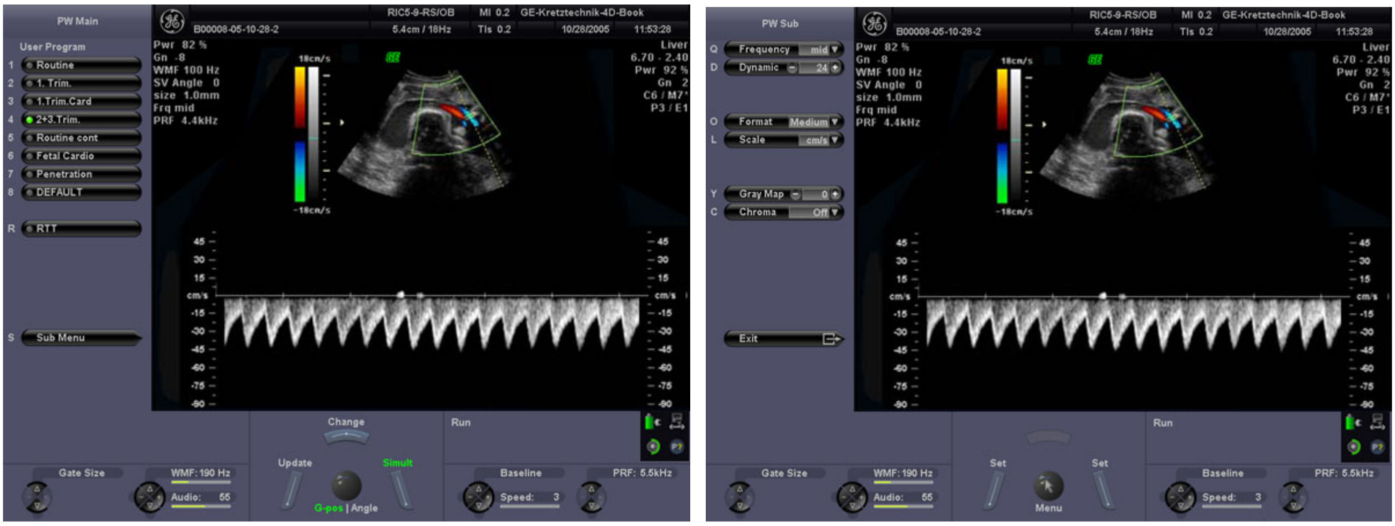

PW Main
User Program
Routine
1. Trim.
1.Trim.Card
2+3.Trim.
Routine cont
Fetal Cardio
Penetration
DEFAULT
RTT
Sub Menu
Change
Update
Simult
G-pos | Angle
Run
Gate Size
WMF: 190 Hz
Audio: 55
Baseline
Speed: 3
PRF: 5.5kHz
PW Sub
Frequency
Dynamic
Format
Scale
Gray Map
Chroma
Exit
Set
Menu

Figure 4-7 PW Main and PW Sub

Table 4-5 Spectral Doppler Mode (PW) Functions

Step	Task	Expected Results
1	Gate Position and Angle	Adjust the G-POS (Gate position) or the ANGLE (cursor can be turned in both directions without stop) with the trackball. The **upper trackball key** changes from Gate position to Angle correction.
2	Activation of Doppler Mode	Press the **right trackball key** to activate the motion display. Press the **left trackball key** to activate PW time-line and 2D/Color.
3	Doppler Gain	Rotate the **ACTIVE MODE** rotary control to adjust the sensitivity (brightness) of the Doppler trace.
4	Steering ← →	Press the **STEERING <-** / **STEERING ->** key on the alphanumeric keyboard. This function is only possible with linear probes.
5	RTT (Real Time Auto-Trace)	The envelope curve of the Doppler spectrum (maximum velocities) and the corresponding evaluations are automatically displayed on the monitor.
6	Doppler Spectrum Invert Dop Inv	Press the **DOP INV** key on the control panel to invert the Doppler spectrum display in relation to the direction of the flow.
7	GATE SIZE	Press the Soft-menu buttons to adjust the size of the doppler Gate.
8	WMF (Wall Motion Filter)	Press the Soft-menu buttons to eliminate Doppler “noise” that is caused by vessel wall motion.
9	AUDIO	Press the Soft-menu buttons to adjust the volume of the audio signal derived from the PW spectrum.
10	BASELINE	Press the Soft-menu buttons to move the baseline up/down. Adjusting the baseline is possible in read- and write Mode.
11	SPEED	Press the Soft-menu buttons to select different sweep speeds.

Table 4-5 Spectral Doppler Mode (PW) Functions

Step	Task	Expected Results
12	PRF (Pulse Repetition Frequency)	The Velocity Range display is governed by the pulse repetition frequency (PRF): Press the Soft-menu buttons to adjust the velocity range desired.
13	FREQUENCY	Serves for selection of the required transmit frequency for actual gate position.
14	DYNAMIC	Dynamic Range adjusts the display cutoff of the Doppler analysis waveform.
15	FORMAT	For selection of either one of three formats.
16	SCALE	To select the displayed measuring unit (in relation to the zero-line).
17	GRAY MAP	A gray map determines the displayed Brightness of an echo in relationship to its amplitude.
18	CHROMA	This defines the relation between echo amplitude (input) and Chroma value (color tone and saturation) in a look-up table.
19	**EXIT**	Press the **EXIT** key on the control panel to exit the PW Sub menu.

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter “PW Mode (Pulsed Wave Doppler)”.

4-4-4 Color Flow Mode Checks

NOTE: *Different menus are displayed depending on which Color Flow Mode (Color or Power) is selected.*

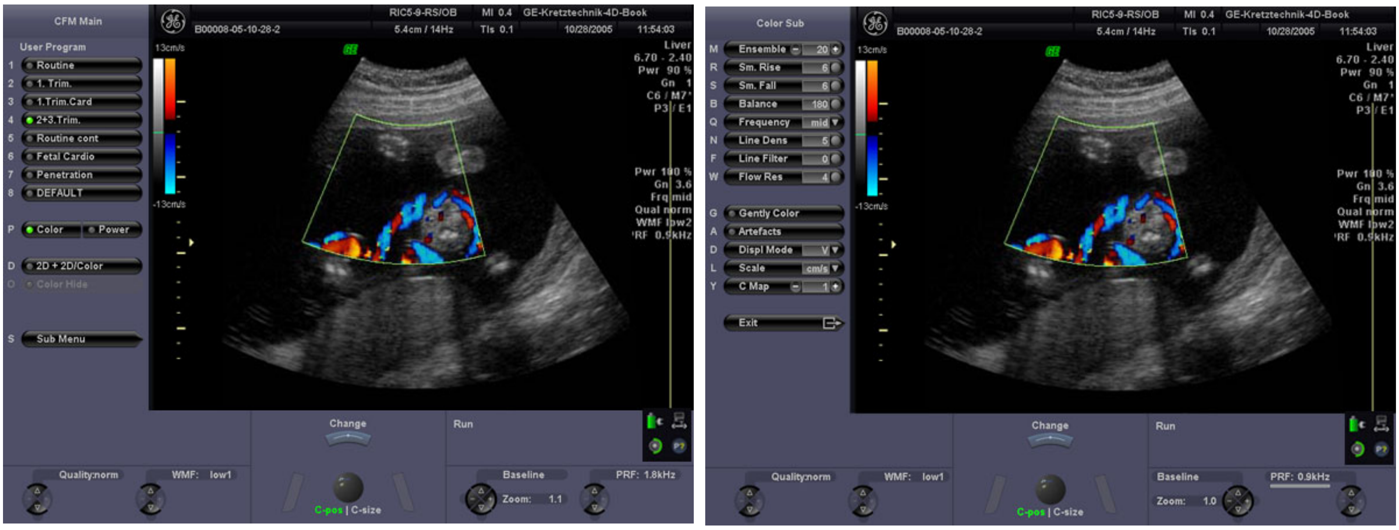

CFM Main
User Program
Routine
1. Trim.
1.Trim.Card
2+3.Trim.
Routine cont
Fetal Cardio
Penetration
DEFAULT
Color
Power
2D + 2D/Color
Color Hide
Sub Menu
Color Sub
Ensemble
Sm. Rise
Sm. Fall
Balance
Frequency
Line Dens
Line Filter
Flow Res
Gently Color
Artefacts
Displ Mode
Scale
C Map
Exit
Change
Run
Quality:norm
WMF: low1
Baseline
PRF: 1.8kHz
PRF: 0.9kHz
Zoom: 1.1
Zoom: 1.0
C-pos | C-size

Figure 4-8 CFM Main and Color Sub Menu

Table 4-6 Color Flow Mode (Color or Power Doppler) Functions HD

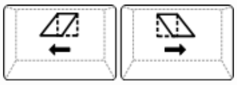
Step	Task	Expected Results
1	● Color ● Power	If not currently activated (key is not illuminated), press the **MENU POINTER** [Cursor] key nearby the trackball, move the cursor to the inactive mode (the currently active mode is marked by the green dot) and then press the **left/right trackball key**.
1	Color Box Position and Color Box Size	Adjust the C-POS (Color Box position) or the C-SIZE (Color Box size) with the trackball. The **upper trackball key** changes from Box position to Box size.
2	Color/PD/HD Doppler Gain	Rotate the **ACTIVE MODE** rotary control to adjust the Color, PD or HD Gain.
3	Steering 	Press the **STEERING <-** / **STEERING ->** key on the alphanumeric keyboard. This function is only possible with linear probes.
4	2D + 2D/COLOR (PD/HD)	Changes the Single image display to two simultaneous half images. The left frame shows only the 2D Mode image. The right frame shows the 2D Mode image with color information.
5	COLOR / PD / HD HIDE	Used to restrain the color information in the displayed image. Ability to remove Color ROI on frozen image.
6	Color Doppler Invert Dop Inv	Press the **DOP INV** key on the control panel to invert the color velocity display around the baseline. This function is impossible in PD Mode.
7	QUALITY	Press the Soft-menu buttons to improve the Color Resolution by reducing the image frame rate and vice versa.
8	WMF (Wall Motion Filter)	Press the Soft-menu buttons to eliminate Doppler “noise” that is caused by vessel wall or cardiac wall motion.

Table 4-6 Color Flow Mode (Color or Power Doppler) Functions HD

Step	Task	Expected Results
9	BASELINE	The baseline shift can be used to prevent aliasing in one flow direction similar to the Doppler baseline shift. Press the Soft-menu buttons to move the baseline up/down. This function is only available in Color Doppler.
10	ZOOM	Press the Soft-menu buttons for image magnification (pan zoom) in read and write mode.
11	PRF	The Velocity Range display is governed by the pulse repetition frequency (PRF). Press the Soft-menu buttons to adjust the velocity range desired
12	ENSEMBLE	Controls the number of pulses to constitute one Color- or Power-Doppler line in the display.
13	SM. RAISE	To select different filter periods for raising velocity. Filtering of the rise velocity leads to noise suppression.
14	SM. FALL	To select different filter periods for falling velocity. This filter leads for “prolongation” of the display flow.
15	BALANCE	The Balance controls the amount of Color display over bright echoes and helps to confine color within the vessels wall.
16	FREQUENCY	It serves for selection of the Transmit Frequency which also depends on the Color Box position.
17	LINE DENS	Determines the line density within the Color-Box. The lower the line density, the larger the line distance and the size of the color pixels.
18	LINE FILTER	With “Line Filter” the signals of the neighboring pulses are less weighted for the display of the actual pulse which considerably improves the detail lateral resolution and signal-to-noise ratio.
19	FLOW RES	The “Flow Resolution” function controls the axial resolution of color in the display. It adjusts the axial sample depth of color pixels.
20	GENTLY COLOR	Gently means the transition between color and gray scale information. The embedding of the color into 2D Mode is performed smoothly with less colored splashes.
21	ARTEFACT (on/off)	Switch on/off the artifact suppression.
22	DISPLAY MODE	To select the CFM- Display Mode.
23	SCALE (Color only)	The maximum velocities are displayed above and under the color scale in kHz, cm/s or m/s.
24	CFM / PD / HD MAP	Provides selectability of the color coding for an optimization of the display of blood flow (similar to the post-processing curves with grayscale 2D scans). After a selection has been made, the color bar displays the resultant map.
25	**EXIT**	Press the **EXIT** key on the control panel to exit the Color or PD Sub menu.

For further details refer to the Voluson i / Voluson e Basic User Manual:

- Chapter “CFM Mode (Color Flow Mode)”
- Chapter “PD Mode (Power Doppler Mode)”

4-4-5 Volume Mode Checks

NOTICE Static 3D, 4D Real Time,TUI*, VCI*, RT 4D Biopsy*, SonoAVC, SonoVCAD heart*, SonoVCAD labor and STIC* are optional.
If these options are not a part of the system configuration, the appendant checks can be obmitted.

BT Version: The options “RT 4D Biopsy” and “VCI” are only applicable at Voluson i systems with BT´07 software and higher.

BT Version: The options “SonoVCAD heart” and “STIC” are only applicable at Voluson i systems with BT’09 software.

BT Version: The options “SonoAVC” and “SonoVCAD labor” are only applicable at Voluson i / Voluson e systems with BT’09 software.

NOTICE Not all Options are available on the **Voluson e** (marked with * in this manual).

BT Version: The options “SonoRS” and “SonoNT” are only applicable at Voluson i / Voluson e systems with BT’11 software.

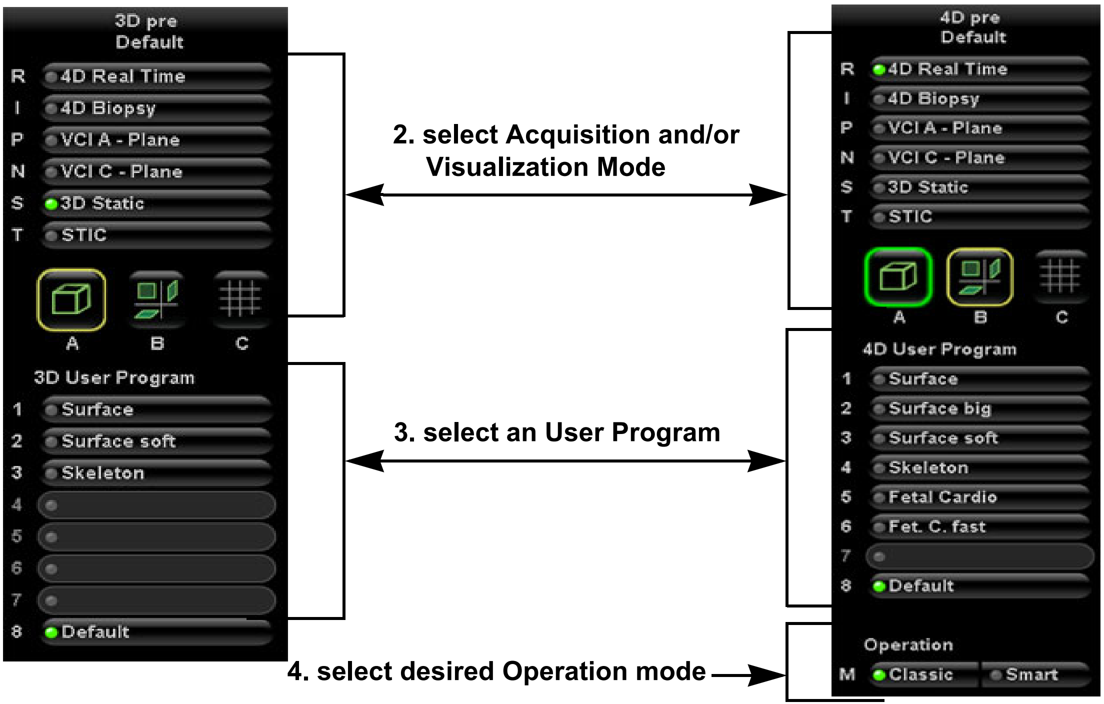
NOTE: Different menus are displayed depending on which Menu and which Volume Mode is selected.

4-4-5-1 Pre-Volume Mode Functions

1. select the desired Volume Acquisition Mode:

4D **Volume Acquisition: Static 3D** **Volume Acquisition: Real Time 4D**

The Volume Mode function is switched on, the “3D Pre” respectively “4D Pre” menu appears on the screen (write mode) and the volume box appears on the Image area.


3D pre
Default
R 4D Real Time
I 4D Biopsy
P VCI A - Plane
N VCI C - Plane
S 3D Static
T STIC
A
B
C
3D User Program
1 Surface
2 Surface soft
3 Skeleton
4
5
6
7
8 Default
4D pre
Default
R 4D Real Time
I 4D Biopsy
P VCI A - Plane
N VCI C - Plane
S 3D Static
T STIC
A
B
C
4D User Program
1 Surface
2 Surface big
3 Surface soft
4 Skeleton
5 Fetal Cardio
6 Fet. C. fast
7
8 Default
Operation
M Classic
Smart

2. select Acquisition and/or Visualization Mode

3. select an User Program

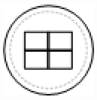
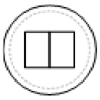
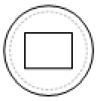
4. select desired Operation mode

5. Start the Volume Acquisition with the Freeze key resp. the right trackball key.

Figure 4-9 Pre-Volume Mode menus

4-4-5-1 Pre-Volume Mode Functions (cont'd)

Table 4-7 Pre-Volume Mode Functions

Step	Task	Expected Results
1	3D RENDERING	3D Static volume acquisition + rendered 3D image (also in combination Color or PD Mode)
2	SECTIONAL PLANES	3D Static volume acquisition resp. 4D volume acquisition without rendered 3D image
3	TUI*	This method of visualization is consistent with the way other medical systems such as CT or MRI, present the data to the user (slices through the data set, which are parallel to each other).
4	4D REAL TIME	Real Time 4D - continuous volume acquisition and parallel calculation of 3D rendered images
5	**RT 4D BIOPSY*** ➡ **BT Version:**	Real Time 4D Biopsy continuous volume acquisition and parallel calculation of 3D rendered images This feature is only available at Voluson i systems with **BT´07** software and higher.
6	**VCI*** ➡ **BT Version:**	Volume Contrast Imaging - improves the contrast resolution and the signal / noise ratio and therefore facilitates finding of diffuse lesions in organs This feature is only available at Voluson i systems with **BT´07** software and higher.
7	**STIC*** ➡ **BT Version:**	The fetal heart or an artery can visualized in 4D (also in combination with PD, HD-Flow or CFM) This feature is only available at Voluson i systems with BT´09 software.
8	**SONOVCAD HEART*** ➡ **BT Version:**	VCAD is a technology that automatically generates a number of views of the fetal heart to make diagnosis easier. At this time it can help to find the right and left outflow tract of the heart and the fetal stomach. By aligning the 4 Chamber view of the heart to a set diagram the system will generate views of LVOT, RVOT, Stomach, IVC/SVC and Ductal arch This feature is only available at Voluson i systems with BT´09 software.
9	**SONOVCAD LABOR** ➡ **BT Version:**	This Feature allows for supervision of labor using specific measurements aided by onscreen orientation marks. This feature is only available at Voluson i / Voluson e systems with BT´09 software.
10	**SONOAVC** ➡ **BT Version:**	This Feature can automatically detect low echogenic objects (e.g., follicles) in a volume of an organ (e.g., ovary) and analyze their shape and volume This feature is only available at Voluson i / Voluson e systems with BT´09 software.
11	Classic Smart	CLASSIC: Advanced Mode with dedicated Voluson Volume features SMART: Easy/Speedy operation with as few controls as possible
12		- Quarter size display of Sectional Planes without 3D image **or** - Quarter size display of Sectional Planes + rendered 3D image (Note: The display depends on selected Acquisition- and Visualization Mode!)
13		Dual size display of Sectional Planes + rendered 3D image. (Note: The display depends on selected Acquisition- and Visualization Mode! This format is not possible for Static 3D Acquisition)
14		- Full size display of a the reference image **or** - Full size display of the rendered 3D image. (Note: The display depends on selected Acquisition- and Visualization Mode!)
15	Volume Box Position and Volume Box Size	Adjust the POS (Position) resp. SIZE of the Volume Box (ROI = Region Of Interest) with the trackball in the 2D Single image. The **upper trackball key** to change the trackball function from Box Position to Box Size.
16	QUALITY	Changes the line density against the acquisition speed (low, mid1, mid2, high1, high2).
17	VOL. ANGLE	To select the Volume Sweep Angle.
18	Start Acquisition	Press the **FREEZE** key resp. the **right trackball key** to start the Volume acquisition.

4-4-5-2 Functions after the 3D Acquisition

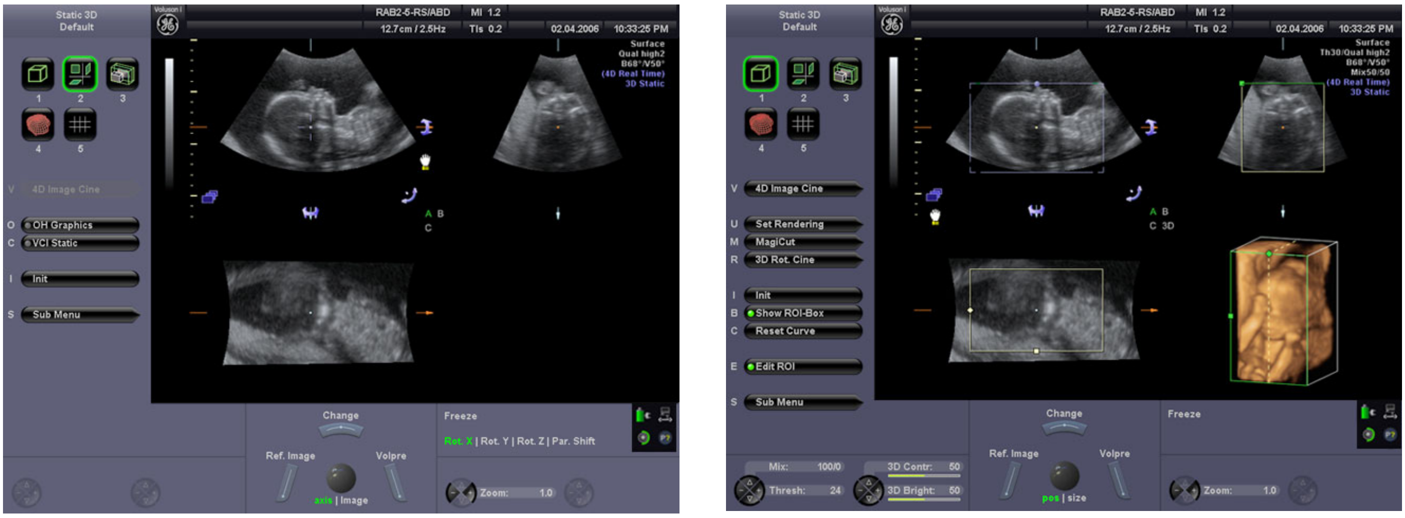
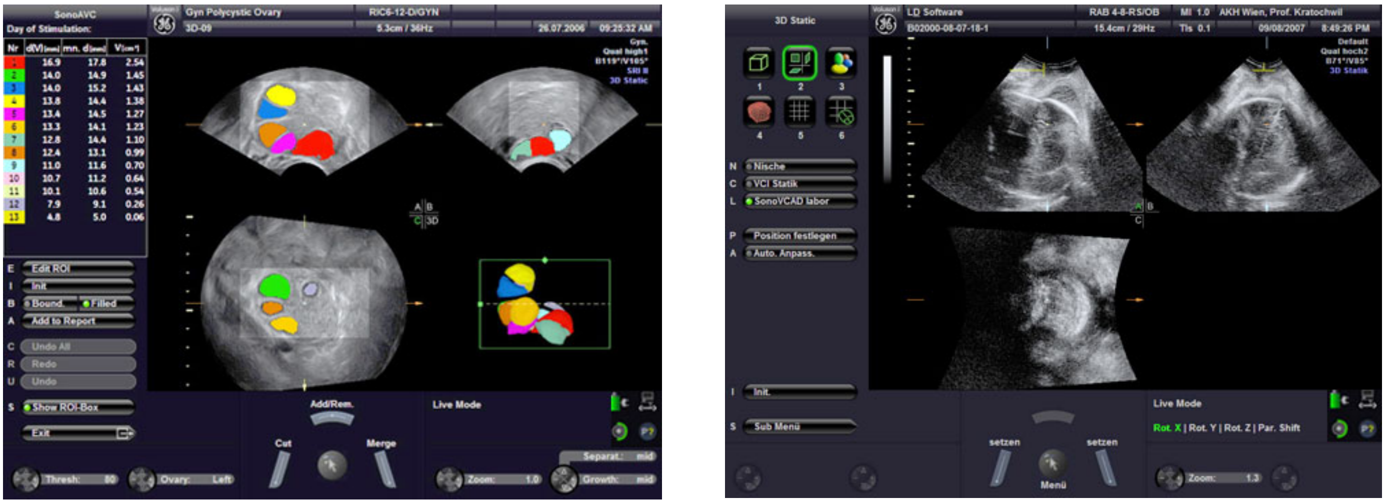

Static 3D
Default
4D Image Cine
OH Graphics
VCI Static
Init
Sub Menu
Set Rendering
MagiCut
3D Rot. Cine
Show ROI-Box
Reset Curve
Edit ROI
Change
Ref. Image
Volpre
Freeze
Rot. X | Rot. Y | Rot. Z | Par. Shift
Zoom: 1.0
Mix: 100/0
Thresh: 24
3D Contr: 50
3D Bright: 60
A B
C 3D

Figure 4-10 3D/4D Main - Sectional Planes and Image Rendering


SonoAVC
Day of Stimulation:
Edit ROI
Init
Bound.
Filled
Add to Report
Undo All
Redo
Undo
Show ROI-Box
Exit
Thresh: 80
Ovary: Left
Add/Rem.
Cut
Merge
Live Mode
Separat.: mid
Zoom: 1.0
Growth: mid
3D Static
Nische
VCI Statik
SonoVCAD labor
Position festlegen
Auto. Anpass.
Init.
Sub Menü
setzen
Menü
Rot. X | Rot. Y | Rot. Z | Par. Shift
Zoom: 1.3

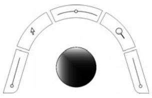
Nr	d(V) (mm)	mn. d (mm)	V (cm³)
1	16.9	17.8	2.54
2	14.0	14.9	1.45
3	14.0	15.2	1.43
4	13.8	14.4	1.38
5	13.4	14.5	1.27
6	13.3	14.1	1.23
7	12.8	14.4	1.10
8	12.4	13.1	0.99
9	11.0	11.6	0.70
10	10.7	11.2	0.64
11	10.1	10.6	0.54
12	7.9	9.1	0.26
13	4.8	5.0	0.06

Figure 4-11 SonoAVC / SonoVCAD

Table 4-8 Functions after the 3D Acquisition

Step	Task	Expected Results
1	Choose the Reference image A B C 3D	If not currently active, press the **MENU POINTER** [Cursor] key near the trackball. Now move the cursor to the desired Sectional Plane (A, B or C) or the rendered 3D image in the lower right quadrant and then press **SET** (right or left trackball key). The chosen reference image is marked by the “green” letter on the screen. **Note:** All control functions are automatically assigned to the image chosen for reference.
2	Move the image	Image data can be moved around.
3	Rotation about **X**-axis	If not currently active, press the **MENU POINTER** [Cursor] key near the trackball. Now move the cursor to this icon on the screen and then press **SET** (right or left trackball key). Use the trackball to rotate the reference image about the X-axis.
4	Rotation about **Y**-axis	If not currently active, press the **MENU POINTER** [Cursor] key near the trackball. Now move the cursor to this icon on the screen and then press **SET** (right or left trackball key). Use the trackball to rotate the reference image about the Y-axis.

Table 4-8 Functions after the 3D Acquisition

Step	Task	Expected Results
5	Rotation about **Z**-axis	If not currently active, press the **MENU POINTER** [Cursor] key near the trackball. Now move the cursor to this icon on the screen and then press **SET** (right or left trackball key). Use the trackball to rotate the reference image about the Z-axis.
6	Parallel Shift (**Z**-axis)	If not currently active, press the **MENU POINTER** [Cursor] key near the trackball. Now move the cursor to this icon on the screen and then press **SET** (right or left trackball key). Use the trackball to shift the reference image along the Z-axis.
7	Movement along **X**- and **Y**-axis 	Use the trackball to move the reference image along the X- and Y-axis. **Note:** The **MENU POINTER** [Cursor] key nearby the trackball must be inactive.
8	Curved Render Start	If not currently active (key is illuminated), press the **MENU POINTER** [Cursor] key nearby the trackball. Move the cursor to the "globe" on the render start line, then press **SET** (right or left trackball key). Move the trackball to adjust the bending (curve) of the render start line.
9	RESET CURVE	Resets the curvature of the render start line to the default position.
10	Niche Mode	Parts of the orthogonal sections A, B and C are complied to a 3D section aspect. The aspect shows quasi a spatial cut into the reference image.
11	VOCAL*	VOCAL is the combination of 3D ultrasound tissue (presented as voxels) and the geometric information of surfaces in a 3D data set. The main contour axis should lie in the center of the 3D lesion. (The 3D object should be centered with respect to the rotation axis.)
12	MIX	Press the Soft-menu buttons to adjust the mix ratio between two calculated modes.
13	TRESH	Press the Soft-menu buttons to adjust the setting. All echoes (or color values) below the level will be disregarded for calculation of the surface.
14	ZOOM	Press the Soft-menu buttons to vary image magnification of the 3D image as well as the sectional planes.
15	OH GRAPHICS	Display of orientation help image figure.
16	VCI* ⇨ **BT Version:**	Volume Contrast Imaging - improves the contrast resolution and the signal / noise ratio and therefore facilitates finding of diffuse lesions in organs This feature is only available at Voluson i systems with **BT´07** software and higher.
17	INIT	Resets the rotations and translations of a volume section to the initial (start) position.
18	3D Image Orientation (left/right, up/down) Я 3D ᴚ	To change the image orientation of the rendered 3D image.
19	MAGI CUT	Ability to electronically manipulate the images and cut away "3D artifacts".
20	EDIT ROI	Readjustment of the volume render box (Region Of Interest = ROI).

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter "Volume Mode"

4-4-5-3 Sub Menu

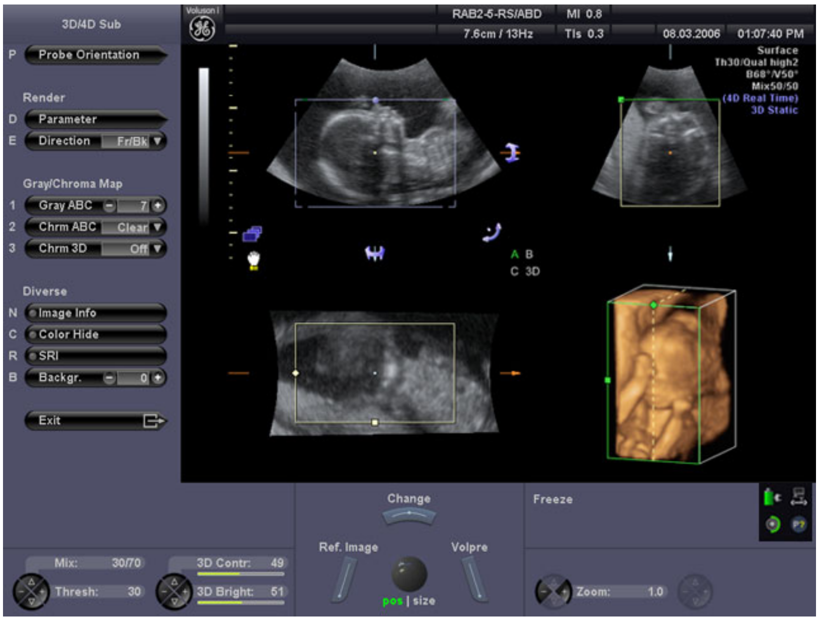

3D/4D Sub
P Probe Orientation
Render
D Parameter
E Direction Fr/Bk
Gray/Chroma Map
1 Gray ABC 7
2 Chrm ABC Clear
3 Chrm 3D Off
Diverse
N Image Info
C Color Hide
R SRI
B Backgr. 0
Exit
Voluson i
RAB2-5-RS/ABD
MI 0.8
7.6cm / 13Hz
TIs 0.3
08.03.2006
01:07:40 PM
Surface
Th30/Qual high2
B68°/V50°
Mix50/50
(4D Real Time)
3D Static
A B
C 3D
Change
Freeze
Ref. Image
Volpre
pos | size
Mix: 30/70
Thresh: 30
3D Contr: 49
3D Bright: 51
Zoom: 1.0

Figure 4-12 3D/4D Sub Menu

Table 4-9 Sub Menus

Step	Task	Expected Results
1	PROBE ORIENTATION	Adjust and activate the display of direction markers at border of the image.
2	Render PARAMETER	To select the Render Mode (Basic Mode and Render Algorithm).
3	Render DIRECTION	To select the desired Render View Direction (green line symbolizes direction of the view). **Note:** The Render View Direction keys are not available in Static 3D Sectional Planes.
4	GRAY ABC	Depending on individual requirements a “harder” or “softer” image can be obtained.
5	CHROMA ABC	To change the Chroma value (color tone and saturation) of the Sectional Plane Images.
6	CHROMA 3D	To change the Chroma value (color tone and saturation) of the rendered 3D image.
7	IMAGE INFO	On/Off switch to show full or reduced Image Info parameter on screen.
8	COLOR HIDE	On/Off switch to show an acquired 3D+Color Doppler or 3D+Power Doppler image with or without the color information.
9	SRI	Speckle Reduction Imaging (SRI) can be activated in all 3D/4D modes (except Full size display) to reduce speckle which interferes with the sectional planes (A, B and C). Note: The rendered 3D image is not affected.
10	BACKGR.	Adjusts the contrast of the screen background from dark to bright. **Note:** This key is not available in Static 3D Sectional Planes mode.
11	3D CONTR.	Adjusts the contrast of the rendered 3D image. **Note:** This key is not available in Static 3D Sectional Planes mode.
12	3D BRIGHT.	Adjusts the brightness of the rendered 3D image. **Note:** This key is not available in Static 3D Sectional Planes mode.

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter “Volume Mode”.

4-4-6 Using Cine

4-4-6-1 Activating Cine

Press **FREEZE**, then roll the **TRACKBALL** to display the images of the stored sequence one by one.

4-4-6-2 Cine-Split Function (Multiple Format)

After **FREEZE** of a sequence in 2D Mode two or four different images of the sequence can be displayed simultaneously in Dual or Quad Display Mode respectively.

Move the **TRACKBALL** to display the images of the stored sequence. Pressing the quad or dual screen key when frozen on a single image causes system to go live. Also once autocine is selected the dual/ quad screen keys are inactive.

Ability to view cine clip of each of the multiformat pictures after acquiring dual or quad screen images. Pressing the dual or quad screen keys respectively cycles through each of the images and the cine clip for that section may be played.

4-4-6-3 Activating 2D Auto Cine

1.) After Freeze press the **LEFT TRACKBALL KEY** (Auto Cine).
2.) Select the START IMAGE of the sequence. The selected image is displayed.
3.) Select the END IMAGE of the sequence. The selected image is displayed.
4.) Select the review **SPEED** and the read **ZOOM** factor.
5.) Select the Cine Mode review direction.
6.) To start/stop the Cine Loop playback press the **RIGHT OR LEFT TRACKBALL KEY**.

After stopping the sequence, move the **TRACKBALL** to display the images one by one.

4-4-6-4 Spectral Doppler- or M Cine Loop

Press **FREEZE**, then roll the **TRACKBALL** to display the Cine / Loop one by one.
Use the top trackball key to switch between loop and cine.

4-4-6-5 Activating 3D Rotation Cine

1.) After 3D Volume acquisition select the 3D ROT. CINE item from the menu area.
2.) Select the ROT. AXIS, the ROT. ANGLE and the STEP ANGLE from the menu area.
3.) Select CALCULATE or press the **RIGHT OR LEFT TRACKBALL KEY** to start the calculation.
4.) To start/stop the 3D Rotation Cine sequence press the **RIGHT OR LEFT TRACKBALL KEY**.

4-4-6-6 Activating 4D Cine

1.) After Real Time 4D acquisition press the Freeze key to display the “4D Cine” menu.
2.) Press the **LEFT TRACKBALL KEY** (Toggle function: Start/Stop).
3.) Select the Cine Mode direction and the review **SPEED**.
4.) To start/stop the Real Time 4D Cine sequence press the **LEFT TRACKBALL KEY**.

NOTE: After stopping a 3D Rotation Cine sequence or a Real Time 4D Cine sequence, move the **TRACKBALL** *to display the images one by one.*

4-4-7 Generic Measurements

NOTE: *Different menus are displayed depending on:*
• the currently selected Application and Display Mode,
• the selected “Study”,
• and the settings in the Measure Setup - **MEASURE & CALC** *page.*

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter 12.

General remarks to perform Generic Measurements:

- By pressing the **CALIPER** key on the control panel the Generic Measurement function is switched on.
- Selection of the desired measurement marks is done with the **MENU POINTER** [Cursor] key and the trackball, or by pressing the corresponding keyboard shortcuts.
- If the **MENU POINTER** [Cursor] key (nearby the trackball) is illuminated, the trackball is consequently assigned to select the menu items in the menu area on the left side of the screen.
- Positioning of measurement marks is done with the **TRACKBALL**.
- Entering and storage of measuring marks is done with **SET** (right or left trackball key).
- To change measuring marks before completion press **CHANGE** (upper trackball key).
- Depending on the setting in the Measure Setup, also the **FREEZE** key can be used for confirming the last measuring mark of the currently performed measurement.
- If the measurement has not been set and you press **BACKSPACE** then it clears the screen.
- If the measurement is set then the cursor appears when selecting **BACKSPACE**.
- To erase measurement results from the screen, press the **CLEAR** key on the control panel or press the **DEL** key on the keyboard.
- All measurement results will be automatically included in the “Generic” section of the worksheet.
- To delete all measurement results of the selected “Study” from the monitor as well as from the corresponding Worksheet, select the CLEAR GROUP item from the menu area.
- To exit from Generic measurements, press the **CALIPER** key or the **EXIT** key on the control panel.

NOTE: *The following instructions assume that you first scan the patient and then press* **FREEZE**.

4-4-7-1 Distance and Tissue Depth Measurements (2D and M Mode)

1.) Press the **CALIPER** key and then select the GENERIC DIST. in the menu area.
2.) Select the appropriate item from the menu area. An active cursor appears.
3.) To position the active cursor at the start point (distance) or the most anterior point (tissue depth), move the **TRACKBALL**.
4.) To fix the start point, press **SET** (the right or left trackball key).
The system fixes the first cursor and displays a second active caliper.
5.) To position the second active caliper at the end point (distance) or the most posterior point (tissue depth), move the **TRACKBALL**.
6.) To complete the measurement, press **SET**.
The system displays the distance or tissue depth value in the measurement results window.

Before you complete a measurement:

To toggle between active calipers, or to re-adjust the traced line, press the upper trackball key.

To erase results, press the **CLEAR** key on the control panel or the **DEL** key on the keyboard.

NOTE: *To alternate the control from one cursor to the other, press* **CHANGE** *(the upper trackball key).*
To re-adjust a traced line, press **UNDO** *(the upper trackball key) repeatedly.*

4-4-7 Generic Measurements (cont'd)

4-4-7-2 Circumference/Area Measurements

1.) Press the **CALIPER** key and then select the GENERIC AREA in the menu area.
2.) Select the corresponding item from the menu area. An active cursor displays.
3.) To position the active cursor, move the **TRACKBALL**.
4.) To fix the start point, press **SET** (the right or left trackball key). The system fixes the first cursor and displays a second active caliper.
5.) To position the second caliper, move the **TRACKBALL** and press **SET** (Rt. / Lt. trackball key).

NOTE: *If you have selected a "trace" item, the measurement is finished and the area and circumference results appear on the screen.*

6.) An ellipse appears the axis of which is defined by these two points.
To adjust the width of the ellipse, move the **TRACKBALL**.
7.) To toggle between calipers, or to readjust a traced line, press the upper trackball key.
8.) To complete the measurement, press **SET** (right or left trackball key). The system displays the circumference and area in the measurement results area.

Before you complete a measurement:

- To erase the ellipse resp. trace and the current data measured, press the **BACKSPACE** key on the keyboard.
  The original caliper is displayed to restart the measurement.
- To exit the measurement function, press the **CALIPER** key or **EXIT** key on the control panel.

4-4-7-3 Volume Measurements

1.) Press the **CALIPER** key and then select the GENERIC VOLUME in the menu area.
2.) Select the appropriate item.
3.) Perform the measurement(s) using the **TRACKBALL** and **SET** (right or left trackball key).
For further details: see 4-4-7-1 and 4-4-7-2.

4-4-7-3-1 Multiplane Measurements

NOTE: *This volume measurement is only possible in 3D Mode.*

1.) Select the reference image in which the measurement is to be performed (A, B or C).
2.) Press the **CALIPER** key once and select the MULTIPLANE item.
3.) Select the first section through the body by pressing the REF.SLICE Soft-menu button (first section should be set at the edge of the object).
4.) Position the start dot of the area which should be surrounded and store it with **SET**.
5.) Surround the area with the trackball, then press **SET** (right or left trackball key). The area is calculated and displayed. It may even be "zero". Press the **SET** key twice.
6.) Select the next parallel section with the REF. SLICE buttons and measure the area.
7.) Repeat 5. and 6. until the edge of the measured object is reached.

NOTE: *The contour of the measured area is not erased if a new section is adjusted.*
To call back the measured areas press the PREV / NEXT Soft-menu buttons.

NOTE: *To erase the results, select the INIT item shown in the menu area.*

4-4-7 Generic Measurements (cont'd)

4-4-7-4 Measurements in Spectral Doppler Mode

NOTE: *The Spectral Doppler image is displayed based on time (X-axis) and velocity (Y-axis).*

4-4-7-4-1 Auto Trace

1.) Press the **CALIPER** key.
2.) Select AUTO TRACE item from the menu area on the left side of the screen.
It traces the Spectral Doppler image automatically and displays the results.
3.) Select the **SENS.** (Sensitivity) of the envelope curve (to eliminate artifacts).
4.) Select the **TRACE** channel of the envelope curve (upper, both, lower).
5.) If necessary, select the Angle and the Baseline.
6.) Press the right or left trackball key **SET** to finish the measurement.

Before you complete the measurement:

- To readjust the start cycle (vertical yellow line), press **CHANGE** (upper trackball key). Press **SET** (right or left trackball key) to fix the line.
- Press the **CHANGE** key again to readjust the end cycle (vertical green line). Press **SET** to fix the line.

NOTE: ***The determination of the envelope curve requires a clear and low-noise record of the Doppler spectrum. Otherwise the reliability of the displayed measurement results may not be ensured!***

4-4-7-4-2 Manual Trace

1.) Press the **CALIPER** key.
2.) Select the MANUAL TRACE item from the menu area. A cursor appears on the screen.
3.) Move the cursor with the **TRACKBALL** to the start point of the measurement and press **SET** (right or left trackball key) to fix the marker.
4.) Trace to the end of the period and press the **SET** key again to fix the mark.
The measurement results appear on the screen.

Before you complete the measurement:

To readjust the traced line, press **UNDO** (upper trackball key) repeatedly.

4-4-7-4-3 Heart Rate

1.) Press the **CALIPER** key.
2.) Select the HR item from the menu area. A line appears on the screen.
3.) Move the line with the **TRACKBALL** to the start point of the period and press **SET** (right or left trackball key). A second line appears.
4.) Move the second line to the end point of the period.
5.) Select the number of “HR cycles” for the measurement with the digipot.
6.) Press the **SET** (right or left trackball key) again to fix the line. The Heart Rate is displayed.

NOTE: *For further Doppler Measurements and other details refer to the Voluson i / Voluson e Basic User Manual, Chapter 13*

4-4-8 Calculations

The Voluson i / Voluson e system supports calculation packages and application-oriented patient Worksheets (Reports) for following applications:

- Abdomen Calculations
- Small Parts Calculations
- Obstetric Calculations
- Cardiology Calculations
- Urology Calculations
- Vascular Calculations
- Gynecology Calculations
- Pediatric Calculations
- Neurology Calculations
- Orthopedics Calculations

NOTE: *Confirm that the patient information is correct and the probe and application are selected properly.*

NOTE: *Different menus are displayed depending on:*
• the currently chosen Application
• the selected Display Mode,
• the selected “Study”,
• and the settings in the Measure Setup - **MEASURE & CALC** *page.*

For further details refer to the Voluson i / Voluson e Basic User Manual, Chapter 13

General remarks to perform Calculations:

- By pressing the **CALC** key on the control panel the Calculation function is switched on.
- Selection of the desired measurement marks is done with the **MENU POINTER** [Cursor] key and the trackball, or by pressing the corresponding keyboard shortcuts.
- If the **MENU POINTER** [Cursor] key (nearby the trackball) is illuminated, the trackball is consequently assigned to select the menu items in the menu area on the left side of the screen.
- Positioning of measurement marks is done with the **TRACKBALL**.
- Entering and storage of measuring marks is done with **SET** (right or left trackball key).
- To change measuring marks before completion press **CHANGE** (upper trackball key).
- Depending on the setting in the Measure Setup, also the **FREEZE** key can be used for confirming the last measuring mark of the currently performed measurement.
- To delete the results of the last measured item, press **BACKSPACE**.
- To erase measurement results, press the **CLEAR** key on the control panel or press the **DEL** key on the keyboard.
- All measurement results will be automatically included in the patient report worksheet.
- To delete all measurement results of the selected “Study” from the monitor as well as from the corresponding Worksheet, select the CLEAR GROUP item from the menu area.
- To exit from Calculation functions, press the **CALC** key or the **EXIT** key on the control panel.

4-4-8-1 Worksheet (Report) Pages

Press the **REPORT** key on the control panel to view the “application dependent” patient worksheet pages that contain the results of calculations and measurements. Any stored patient worksheet can be edited, printed, transferred, saved to Sonoview or sent to DICOM® server.

4-4-9 Probe/Connectors Usage

4-4-9-1 Connecting a probe

1.) Place the probe's carrying case on a stable surface and open the case.
2.) Carefully remove the probe and unwrap the probe cable.
3.) Press the probe connector locking lever *downwards.*
Afterwards align the connector with the probe port and carefully push it into place.
4.) Press the connector locking lever *upwards* to the full vertical position to lock it.
5.) Carefully position the probe cord so that it is free to move and is not resting on the floor.

4-4-9-2 Activating the probe

Press the **PROBE** key on the alphanumeric keyboard to activate the “Probe Select” menu.
Select the appropriate probe using the **TRACKBALL** and the **TRACKBALL KEYS**.
Upon selection of an “Application”, the programmed user presets appear.
Clicking a “Setting” field causes loading of the preset.

The probe is initialized, the main menu (2D mode) and the ultrasound image appears on the monitor in write mode (real time display).

4-4-9-3 Deactivating the probe

When deactivating the probe, the probe is automatically placed in standby mode (read mode).

1.) Press the **FREEZE** key.
2.) Gently wipe the excess gel from the face of the probe. (Refer to the Basic User Manual of Voluson i / Voluson e for complete cleaning instructions.)
3.) Carefully slide the probe around the right side of the keyboard, toward the probe holder. Ensure that the probe is placed gently in the probe holder.

4-4-9-4 Disconnecting the probe

Prior to disconnecting a probe freeze the image. It is unnecessary to switch the unit off.

CAUTION **If a probe is disconnected while running (write mode) a software error may occur. In this case switch the unit OFF (perform a reset).**

1.) Press the locking lever *downwards* to unlock it.
2.) Carefully slide the probe and connector away from the probe port and around the right side of the keyboard.

4-4-9-5 Connecting a probe to the Dock Cart / Voluson Station

The Probe Box enables the connection of up to 3 probes to the Voluson i / Voluson e.

1.) Push the probe connector into the probe socket of the Voluson i / Voluson e.
2.) Lift the locking lever upwards to lock the probe connector.

4-4-10 Image Management (Sonoview)

For Sonoview - Image Management functionality refer to the Basic User Manual of Voluson i/e. It talks about several topics:

- Clipboard
- Sending Exams
- Printing Exams / Images
- Export Exams / Images
- Backup Exams
- Restore the Backup Exams
- DICOM® Print / Send
- Verifying and Pinging a Device
- Sending Images via e-mail
- Browsing and Managing an Exam’s stored Image
- Connectivity, and Dataflow Concept and Creation
- Configuring Connectivity
- Services (Destinations)
- Input of comments and voice annotations
- Measure Distance and Ellipse
- Buttons
- Views
- DVD/CD+(R)W Erasing
- Changing Backup Folder on mapped Network Drive
- etc.

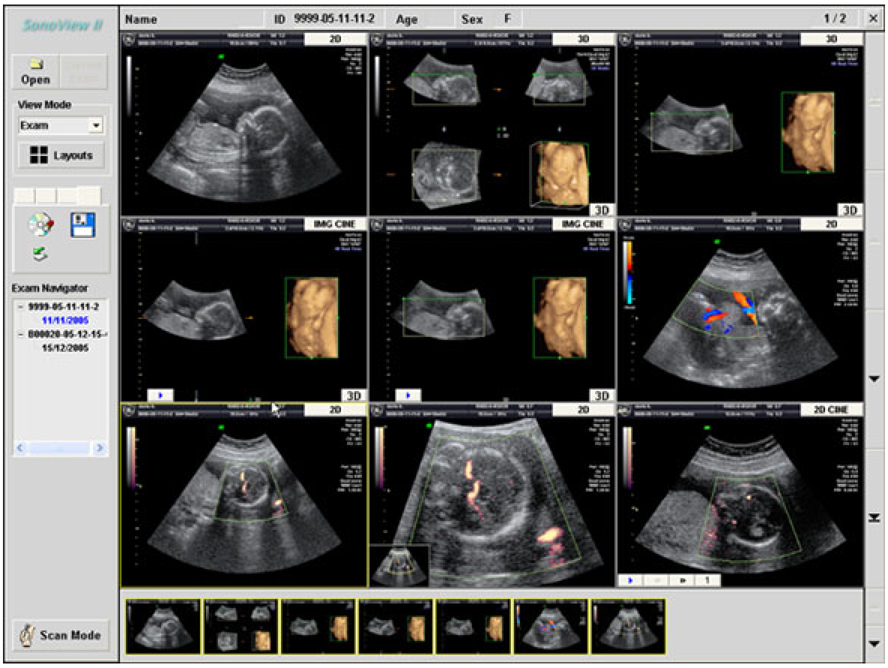

SonoView II
Open
View Mode
Exam
Layouts
Exam Navigator
9999-05-11-11-2
11/11/2005
B00020-05-12-15-
15/12/2005
Scan Mode
Name
ID 9999-05-11-11-2
Age
Sex F
1 / 2
2D
3D
IMG CINE
2D CINE

Figure 4-13 Sonoview

4-4-11 Formatting Media

To erase the backup media DVD/CD+RW, press the **ARCHIVE** key on the Control panel.

The Sonoview screen appears on the monitor; see: Figure 4-13 on page 4-26.

1.) Select the “External Devices” tab on the left side of the Sonoview screen.

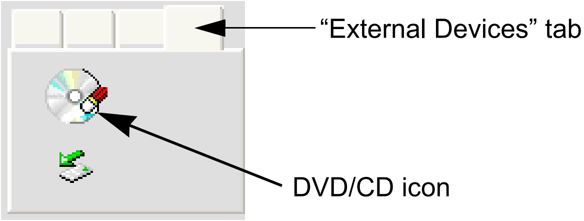
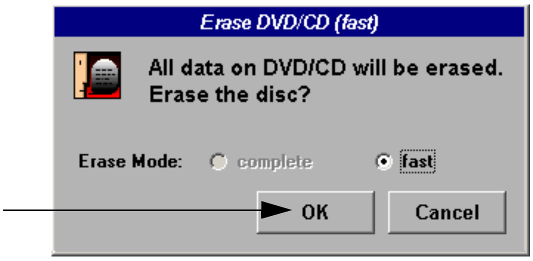


Figure 4-14 “External Devices” tab

2.) Insert the medium and select the DVD/CD icon.
The unit displays the “Erase DVD/CD” window as shown in Figure 4-15.

3.) Select the “Erase Mode” and click the [OK] button to start the process.

NOTICE It is highly recommended to use the complete erase mode, to avoid problems with the CD+RW! When using a DVD+RW, the complete erase mode is not possible.


Erase DVD/CD (fast)

All data on DVD/CD will be erased.
Erase the disc?

Erase Mode: ○ complete ● fast

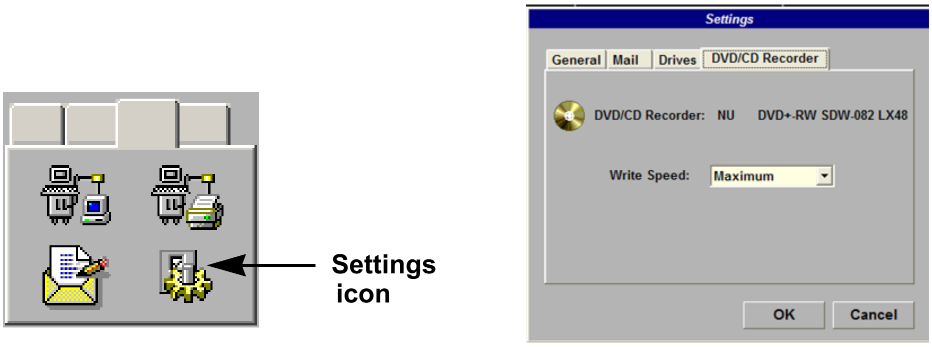
Figure 4-15 Erase DVD/CD Window

4.) When erasing is finished, select **EXIT** to return to the Scan Mode.

4-4-11-1 Adjusting the Write Speed of the DVD/CD Recorder

1.) Click the SETTINGS icon on the left side of the Sonoview screen.

2.) Select DVD/CD RECORDER from the tool bar.



DVD/CD Recorder: NU DVD+-RW SDW-082 LX48

Write Speed: Maximum

Figure 4-16 Settings of the DVD/CD Recorder

3.) Choose the “Write Speed” from the corresponding pop-up menu.

Section 4-5
Backup and Restore Database, Preset Configurations and Images

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
3.) Select the BACKUP page.

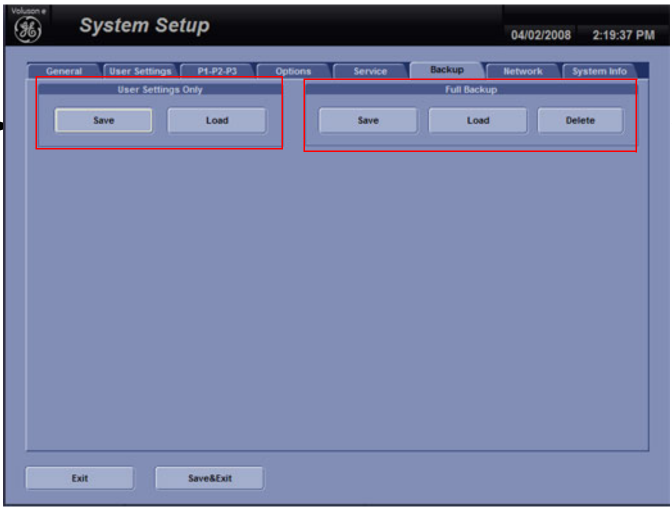

“User Settings Only” group
“Full Backup” group
Voluson e
System Setup
04/02/2008
2:19:37 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
User Settings Only
Save
Load
Full Backup
Save
Load
Delete
Exit
Save&Exit

Figure 4-17 System Setup - Backup page

The “Backup” page is subdivided in two main groups:

A.) User Settings Only

- Section 4-5-1 "Save User Settings Only (Application Settings)" on page 4-29
- Section 4-5-2 "Load User Settings Only (Application Settings)" on page 4-30

B.) Full Backup

- Section 4-5-3 "Save Full Backup (Presets, Configurations & Application Settings)" on page 4-32
- Section 4-5-4 "Load Full Backup (Presets, Configurations & Application Settings)" on page 4-34
- Section 4-5-5 "Delete Full Backup (Presets, Configurations & Application Settings)" on page 4-36

The User Settings and/or Full Backup can be saved to the following destinations:

- D: partition of internal hard disk
- DVD/CD+(R)W
- Mapped Network Drive **Z:**
  see: Section 3-12-3 "Map Network Drive" on page 3-118
- Any other drive connected to the system (e.g.; USB Flash Memory device)
  Note: This function is only available in the Full Backup utility.
  For further details review: Section 3-5-5 on page 3-44.

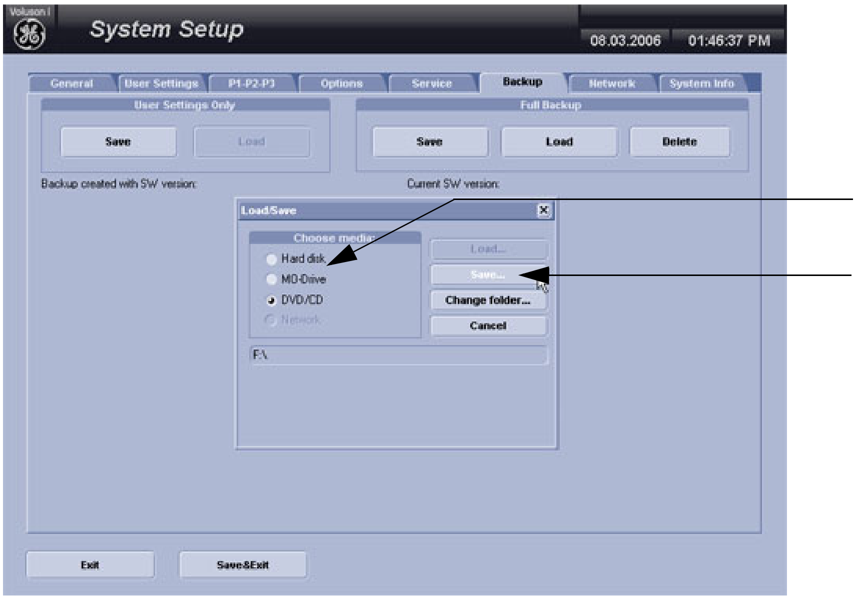
NOTICE When connecting external USB devices, be sure to execute Safety Directions found in the Voluson i / Voluson e Basic User Manual.

4-5-1 Save User Settings Only (Application Settings)

The User Settings contains:

- Application Settings
- User Programs
- Auto Text
- 3D/4D Programs

1.) Insert a DVD/CD+(R)W into the drive.
2.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
3.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
4.) Select the BACKUP page.
5.) Click the SAVE button of the “User Settings Only” group.


Voluson i
System Setup
08.03.2006
01:46:37 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
User Settings Only
Save
Load
Full Backup
Save
Load
Delete
Backup created with SW version:
Current SW version:
Load/Save
Choose media:
○ Hard disk
○ MO-Drive
● DVD/CD
○ Network
Load...
Save...
Change folder...
Cancel
F:\
Exit
Save&Exit

Choose the media and then click Save

Figure 4-18 User Settings Only - Save window

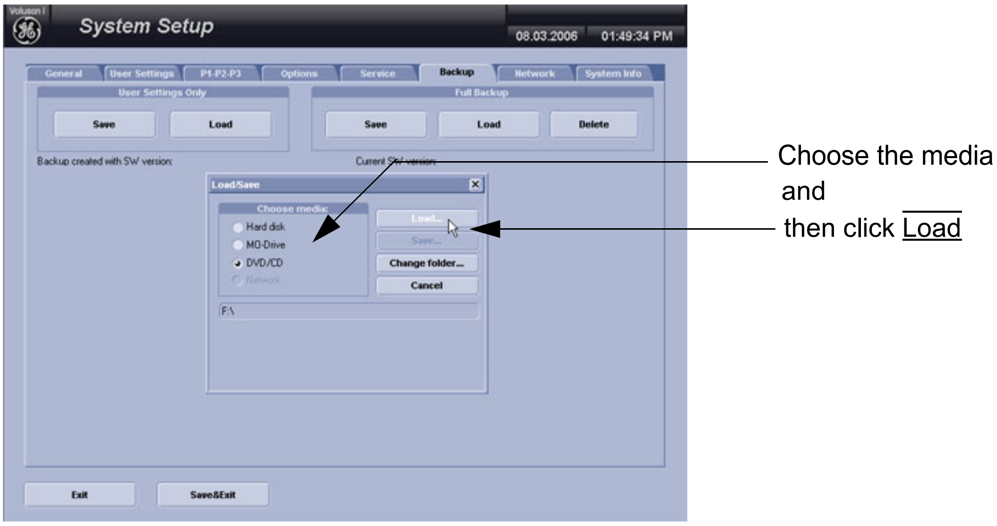
6.) Choose the media and click the SAVE button.
7.) Select the NEW FILE... key and enter a file name (without extension).
8.) Click the OK key to start the process. When the saving has been completed, click OK.

4-5-2 Load User Settings Only (Application Settings)

CAUTION The loading procedure overwrites the existing application settings on the local hard drive. Make sure to insert the correct DVD/CD. Additionally you can load the backup from D:\User Settings.

4-5-2-1 Preparations

1.) Insert the DVD/CD+(R)W into the drive.
2.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
3.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
4.) Select the BACKUP page and click the LOAD button of the “User Settings Only” group.


Voluson i
System Setup
08.03.2006
01:49:34 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
User Settings Only
Save
Load
Full Backup
Save
Load
Delete
Backup created with SW version:
Current SW version:
Load/Save
Choose media:
Load...
Save...
Change folder...
Cancel
Exit
Save&Exit
Choose the media
and
then click Load

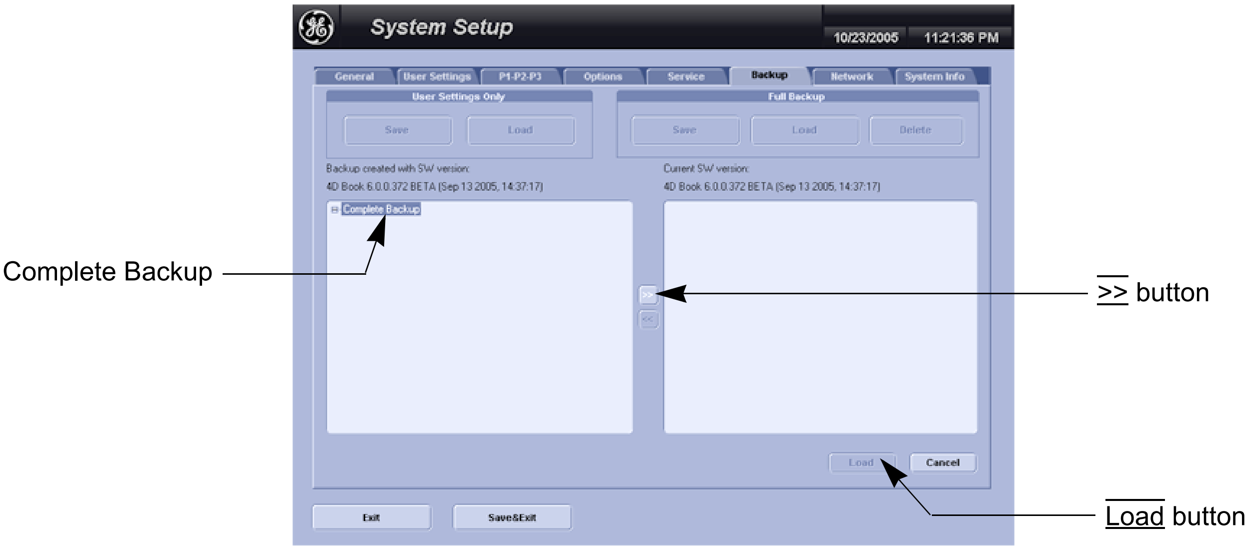
○ Hard disk
○ MO-Drive
● DVD/CD
○ Network

F:\

Figure 4-19 User Settings Only - Load window

5.) Choose the media and click the LOAD key.
6.) Select the appropriate file and click OK. The “Load Backup Data” window appears.

NOTICE It is highly recommend to use Application settings which are adapted for the systems software version!


System Setup
10/23/2005
11:21:36 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
User Settings Only
Save
Load
Full Backup
Save
Load
Delete
Complete Backup
>>
<<
Load
Cancel
Exit
Save&Exit
Complete Backup
>> button
Load button

Backup created with SW version:
4D Book 6.0.0.372 BETA (Sep 13 2005, 14:37:17)

Current SW version:
4D Book 6.0.0.372 BETA (Sep 13 2005, 14:37:17)

Figure 4-20 Load Backup Data

4-5-2 Load User Settings Only (Application Settings) (cont'd)

7.) Select the desired loading procedure:

- Load "Complete Backup" on page 4-31
- Load only parts of the "Complete Backup" on page 4-31

4-5-2-2 Load "Complete Backup"

NOTE: *Following procedure should be used, if the user prefers factory default settings, which are adapted for the installed Application Software version.*

1.) Perform Preparations on page 4-30.

2.) Select the **Complete Backup** (marked blue; see: Figure 4-20 on page 4-30) and click the >> button to copy the Complete Backup into the Load Data field.

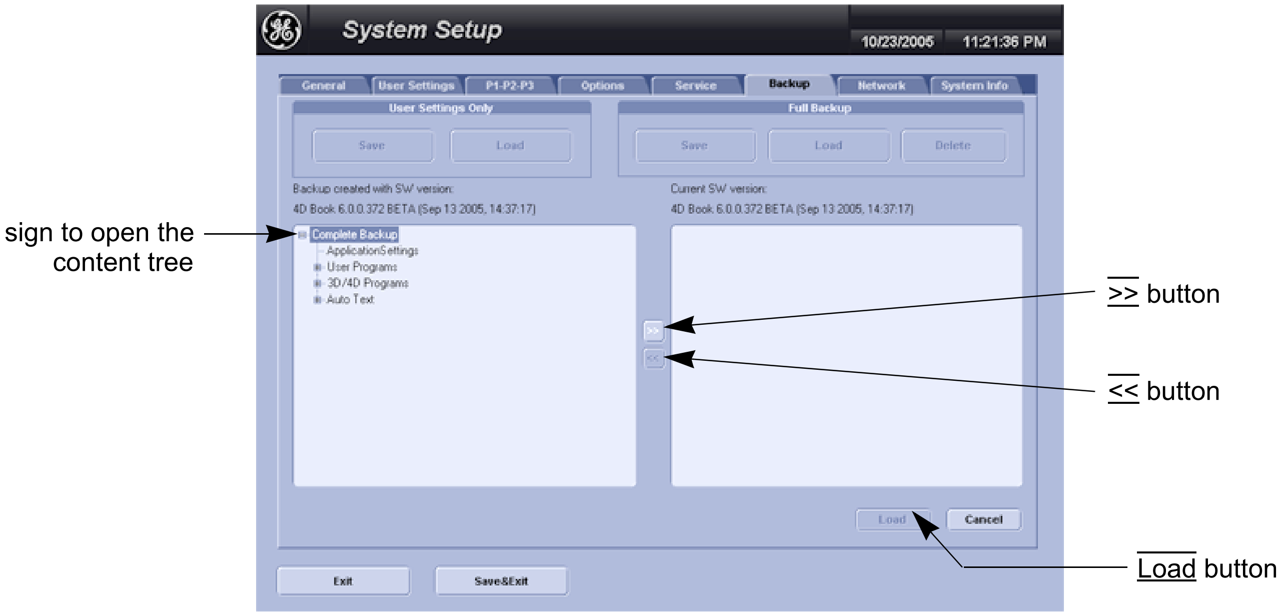
3.) Click the LOAD button to start the loading procedure of the complete backup into the system.

4-5-2-3 Load only parts of the "Complete Backup"

NOTE: *Following procedure is required, if the user prefers to keep his "old" setting, but new presets have to be added to match the installed Application Software version (e.g., User Programs and 3D/4D Programs for new probe, etc.)*

1.) Perform Preparations on page 4-30.

2.) Click the + sign (next to "Complete Backup") to open the content tree.



System Setup
10/23/2005
11:21:36 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
User Settings Only
Save
Load
Full Backup
Save
Load
Delete
Complete Backup
ApplicationSettings
User Programs
3D/4D Programs
Auto Text
>>
<<
Load
Cancel
Exit
Save&Exit
sign to open the content tree
>> button
<< button
Load button

Backup created with SW version:
4D Book 6.0.0.372 BETA (Sep 13 2005, 14:37:17)

Current SW version:
4D Book 6.0.0.372 BETA (Sep 13 2005, 14:37:17)

Figure 4-21 Load only parts of the Backup

3.) Click the >> button to copy the selected item into the Load Data field.

4.) To return selected items from the Load Data field to Backup Data field select the << button.

5.) Click the LOAD button to start loading procedure of the selected Backup item into the system.

4-5-3 Save Full Backup (Presets, Configurations & Application Settings)

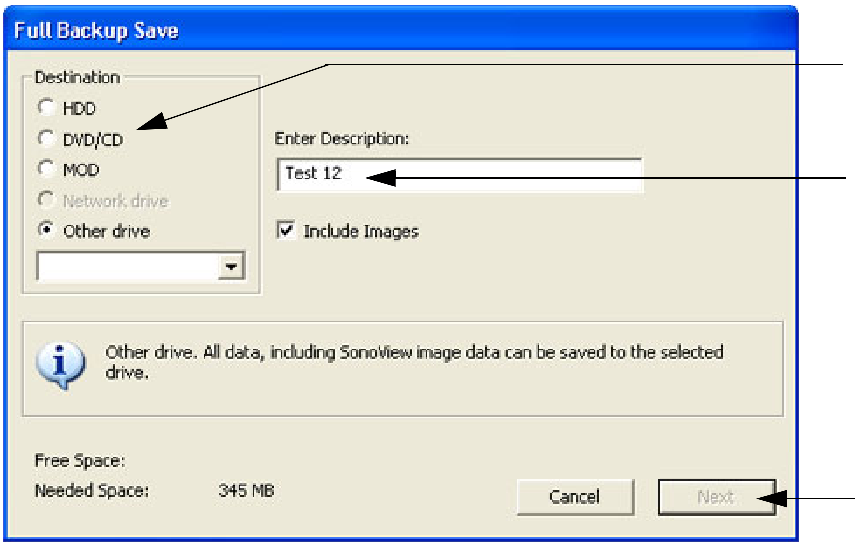
A full backup always contains the following data

- Patient demographic and exam data (database containing the patient data and measurements)
- SonoView image data (**NOT** available when saving to the internal hard disk or DVD/CD)
- User Settings (databases and files containing gray curves and the user settings.)
- Image transfer settings (DICOM® settings e.g., DICOM® servers, AE Title, Station Name, etc.)
- Measure Setup Settings (user specific measure settings)
- Machine settings (general settings such as language, time/date format and the enabled options)
- Windows Network Settings (network settings including the computer name)
- Serviceplatform (state of the Service Software)
- VP (additional system data)

CAUTION **It is recommended to create a full backup of the settings once a week.**

NOTE: *Always “Full Backup” any presets, configurations and application settings to HDD and/or DVD before upgrading the software and/or application settings. This ensures that if the presets need to be reloaded, will be the same ones the customer was using prior to service.*

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
3.) Select the BACKUP page and click the SAVE button of the “Full Backup” group.



Full Backup Save

Destination
○ HDD
○ DVD/CD
○ MOD
○ Network drive
● Other drive

Enter Description: Test 12

☑ Include Images

Other drive. All data, including SonoView image data can be saved to the selected drive.

Free Space:
Needed Space: 345 MB

choose destination

enter description

click Next

Figure 4-22 Full Backup Save

4.) Choose the Destination.
5.) Enter the description of the full backup.
6.) If desired and possible (Network Drive and Other drive **only**), activate “Include Images.

NOTE: *The “Include Images” option may result in a large amount of data: up to **70 Gigabytes**!*

7.) Select the NEXT button. To start the backup process click YES.

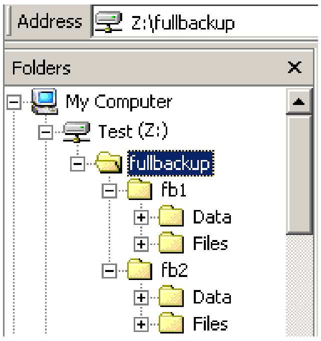
After copying the data, the Voluson i / Voluson e reboots and the application starts again.

4-5-3 Save Full Backup (Presets, Configurations & Application Settings) (cont'd)

When the Full Backup is stored on a network drive (to map a network drive see: Section 3-12-3 "Map Network Drive" on page 3-118), it may be desirable to move the data (e.g., for backup or maintenance).

The backups reside in sub folders of the main "*fullbackup*" -folder found at the root of the drive.
For Example: Backups on the mapped **Network Drive** are below path **Z:\fullbackup**.

The directory structure of the full backup data is as follows:

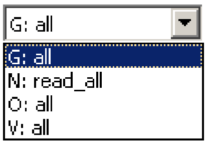


The sub folders have the names *fb**X*** where ***X*** is a number (e.g., Z:\fullbackup\fb1).

The data resides within a directory structure within these sub folders. It is possible to move the *fb**X*** sub folders, even leaving gaps in the numeration sequence.

However, **NO** change **MUST** be made to the contents of the *fb**X*** folders itself, otherwise the backup data cannot be restored!

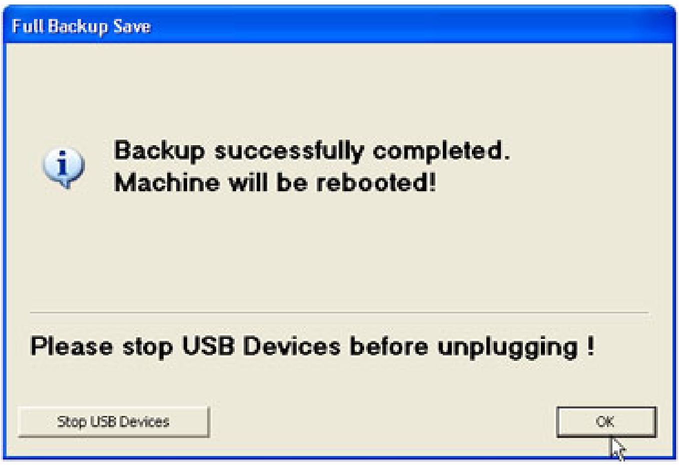
Figure 4-23 directory structure of full backup data



If the destination „Other drive" is selected, the available drives (e.g., external USB-memory stick) can be chosen from the drop down menu.

Figure 4-24 "Other drive" drop down menu

NOTICE When the backup is saved to an external USB-device, the system has to be informed about the removal of the hardware. For this purpose every last dialog of "Full Backup Save" and "Full Backup Delete" has a STOP USB DEVICES button (see: Figure 4-25).



Backup successfully completed.
Machine will be rebooted!

Please stop USB Devices before unplugging !

Figure 4-25 Please stop USB Devices before unplugging!

For further details review: Section 3-5-5 on page 3-44.

4-5-4 Load Full Backup (Presets, Configurations & Application Settings)

WARNING ***It is recommended to backup data before an upgrade; see: Section 4-5-3 on page 4-32.***

The "Full Backup" loading procedure replaces (overwrites) ALL the existing data on the local hard drive of the Voluson i / Voluson e system!

NOTICE It is **neither required nor advisable to reload a previously stored "Full Backup"** after a software upgrade that was performed by means of the FMI FROM DVD button!

NOTICE After "Full Backup" loading procedure, **it is essential to load (at least!) the proper Application Settings (image presets)**, adapted for the used system software version.
Refer to Section 4-5-2 "Load User Settings Only (Application Settings)" on page 4-30.

Please note: When reloading these Application Settings, any previous modifications done by the user to his user settings (sub menu parameters, naming, …) will **NOT be affected!**

CAUTION **There are circumstances where it is not possible to load (restore) all the data.**
The following rules specify the restrictions:

1.) Generally, **only** restoring data from an older to a newer software version is possible.
Loading a backup into a system that has a lower software version than the system the backup was created on is prohibited.

2.) Options can **only** be restored on the same Voluson i / Voluson e system within the same major software version.

3.) When loading a backup into a system with a software version that has a higher major number (6.x.x -> 7.x.x), the following items will not be restored:

    A.) User Settings
    B.) Options
    C.) State of the Service Platform

4.) The **user** is **only** allowed to restore data to a different system if and only if the software version on this system is the same as in the backup.

5.) The **user** is **only** allowed to restore data onto the same system if and only if the software version on this system is equal or higher than the version in the backup.

6.) The **user** is **not** allowed to restore the following items to a different system:

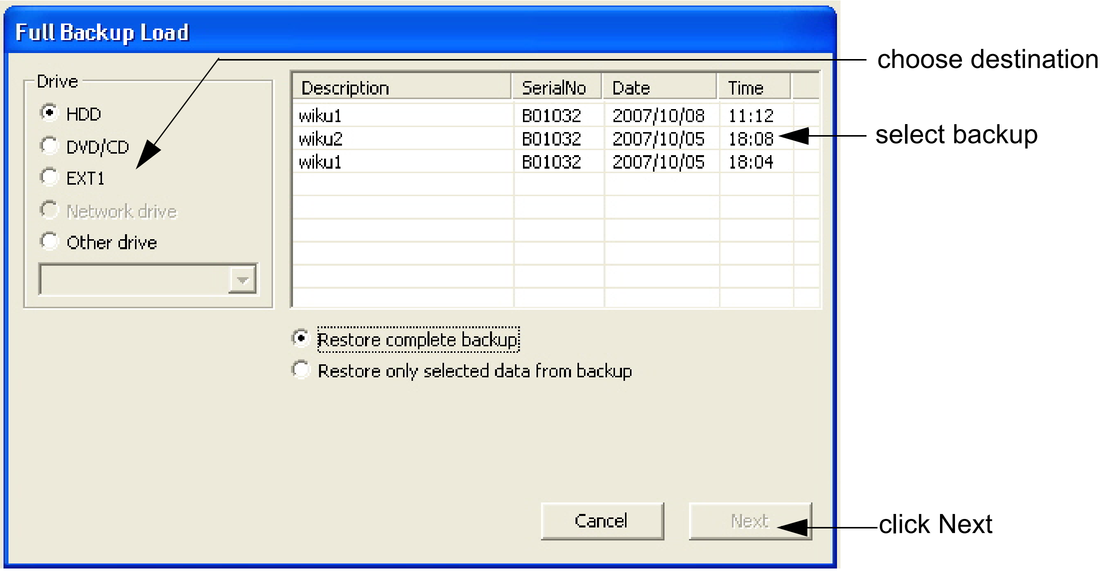
    A.) Windows Network Settings
    B.) Options
    C.) DICOM® AE Title
    D.) DICOM® Station Name
    E.) State of the Service Platform

4-5-4 Load Full Backup (Presets, Configurations & Application Settings) (cont'd)

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.

2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.

3.) Select the BACKUP page and click the LOAD button of the "Full Backup" group.



Drive
- ● HDD
- ○ DVD/CD
- ○ EXT1
- ○ Network drive
- ○ Other drive

Description	SerialNo	Date	Time
wiku1	B01032	2007/10/08	11:12
wiku2	B01032	2007/10/05	18:08
wiku1	B01032	2007/10/05	18:04

- ● Restore complete backup
- ○ Restore only selected data from backup

choose destination

select backup

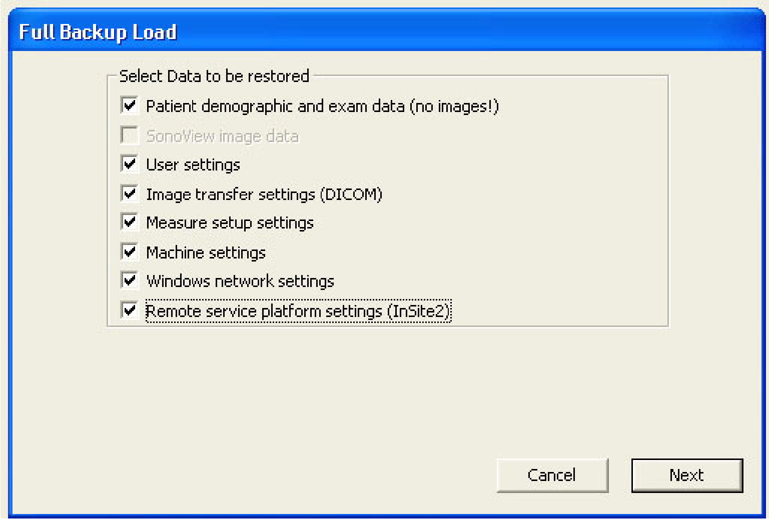
click Next

Figure 4-26 Full Backup Load

4.) Choose the Destination.

5.) Click on the backup to be restored (additional information is displayed in the table).

6.) Select the NEXT button. The following window will be displayed.



Select Data to be restored
- ☑ Patient demographic and exam data (no images!)
- ☐ SonoView image data
- ☑ User settings
- ☑ Image transfer settings (DICOM)
- ☑ Measure setup settings
- ☑ Machine settings
- ☑ Windows network settings
- ☑ Remote service platform settings (InSite2)

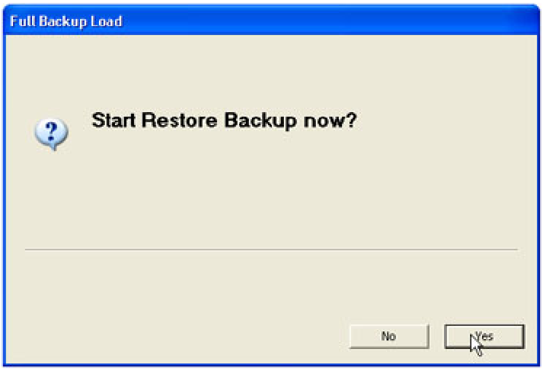
Figure 4-27 Select Data to be restored

7.) Select the data to be restored to the Voluson i / Voluson e system.

NOTE: For description of the check box names review: A full backup always contains the following data.

4-5-4 Load Full Backup (Presets, Configurations & Application Settings) (cont'd)

8.) Click the NEXT button and then select YES to start, or NO to cancel the restore procedure.



Start Restore Backup now?

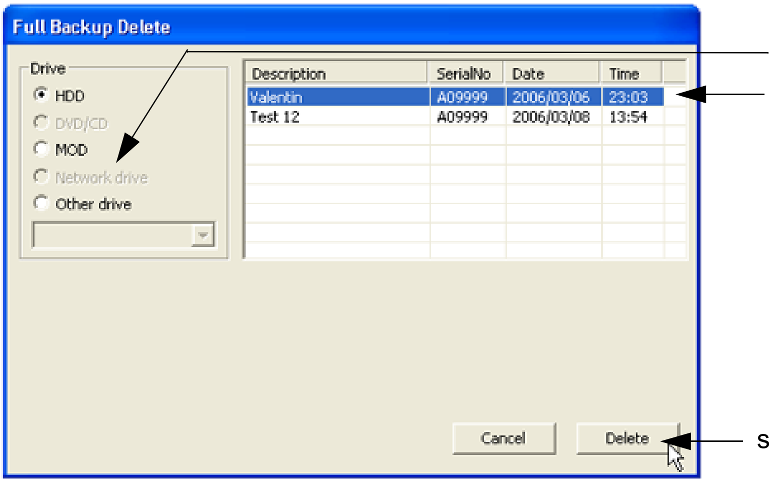
Figure 4-28 Start Restore Backup now?

WARNING ***When clicking "YES", the current data on the system will be permanently replaced by the data of the backup and can not be restored!***

After restoring the data, the Voluson i / Voluson e reboots and the application starts again.

4-5-5 Delete Full Backup (Presets, Configurations & Application Settings)

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
3.) Select the BACKUP page and click the DELETE button of the "Full Backup" group.



Drive: ● HDD

Description	SerialNo	Date	Time
Valentin	A09999	2006/03/06	23:03
Test 12	A09999	2006/03/08	13:54

choose destination

select backup

select Delete

Figure 4-29 Full Backup Delete

4.) Choose the Destination.
5.) Click on the backup to be deleted (additional information is displayed in the table).
6.) Select the DELETE button.

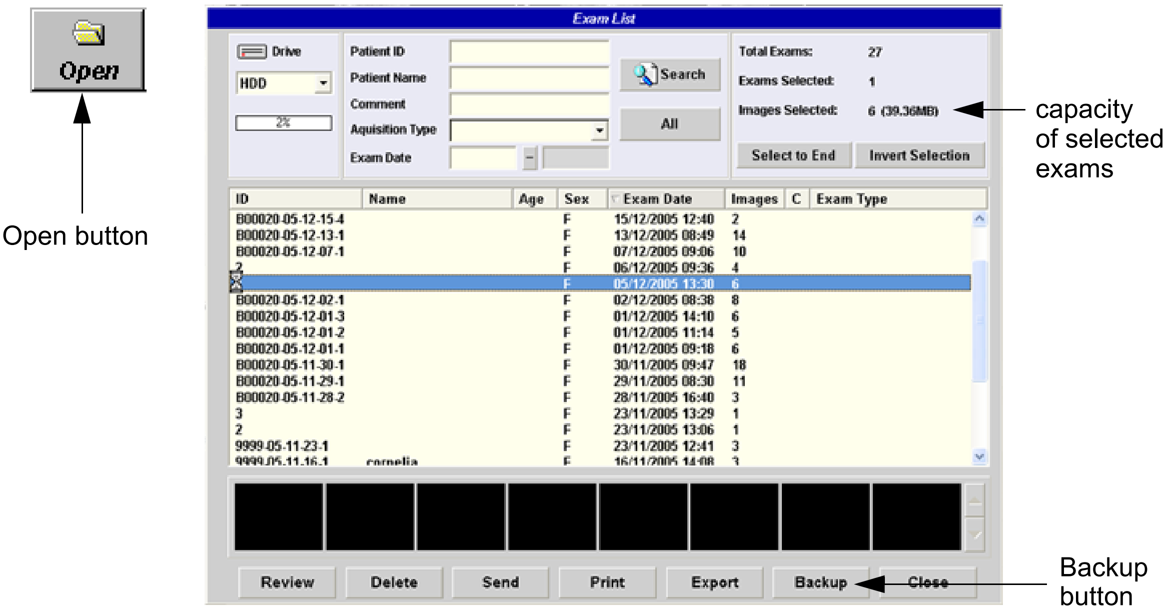
WARNING ***There is no " UNDO" function for this action!***

4-5-6 Archiving Images

1.) Press the **ARCHIVE** key on the control panel to enter Sonoview.

2.) Insert the DVD/CD+(R)W into drive.
If required, format/erase the media, see Section 4-4-11 "Formatting Media" on page 4-27.

3.) When you click the OPEN button on the upper left side of the screen, a list of all the exams is displayed see Figure 4-30.


Open
Open button
Exam List
Drive
Patient ID
Patient Name
Comment
Aquisition Type
Exam Date
Search
All
Select to End
Invert Selection
capacity of selected exams
Review
Delete
Send
Print
Export
Backup
Close
Backup button

HDD
2%

Total Exams: 27
Exams Selected: 1
Images Selected: 6 (39.36MB)

ID	Name	Age	Sex	Exam Date	Images	C	Exam Type
B00020-05-12-15-4			F	15/12/2005 12:40	2		
B00020-05-12-13-1			F	13/12/2005 08:49	14		
B00020-05-12-07-1			F	07/12/2005 09:06	10		
2			F	06/12/2005 09:36	4		
			F	05/12/2005 13:30	6		
B00020-05-12-02-1			F	02/12/2005 08:38	8		
B00020-05-12-01-3			F	01/12/2005 14:10	6		
B00020-05-12-01-2			F	01/12/2005 11:14	5		
B00020-05-12-01-1			F	01/12/2005 09:18	6		
B00020-05-11-30-1			F	30/11/2005 09:47	18		
B00020-05-11-29-1			F	29/11/2005 08:30	11		
B00020-05-11-28-2			F	28/11/2005 16:40	3		
3			F	23/11/2005 13:29	1		
2			F	23/11/2005 13:06	1		
9999-05-11-23-1			F	23/11/2005 12:41	3		
9999-05-11-16-1	cornelia		F	16/11/2005 14:08	3		

Figure 4-30 Sonoview Screen

4.) Select the exam(s) using the **TRACKBALL**, the **CTRL** or **SHIFT** key on the alphanumeric keyboard and the right trackball key **SET**.

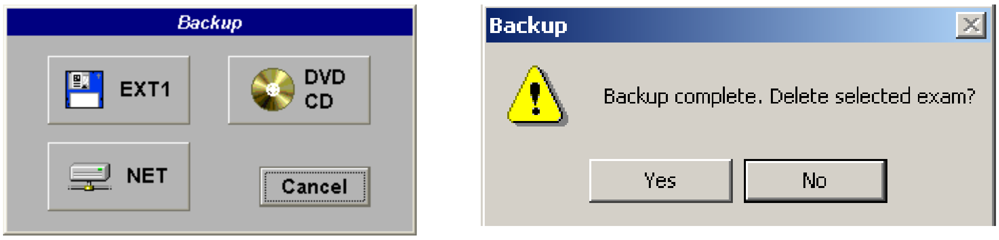
The number of all exams, the number of currently selected exams, the number of images and the capacity of selected images are displayed automatically at the right and upper corner of the exams list.

5.) Click the BACKUP button.

6.) Select the destination for the backup.

NOTE: For destination NET perform Section 3-12-3 "Map Network Drive" on page 3-118 first.

7.) After finishing the backup, select whether the selected exam(s) is to be deleted or not.


Backup
EXT1
DVD
CD
NET
Cancel
Backup
Yes
No

Backup complete. Delete selected exam?

Figure 4-31 Backup windows

NOTICE If you select to delete the exam after finishing the backup, it will be absolutely deleted from the hard disk of the ultrasound scanner Voluson i / Voluson e!

For further information (e.g., Restoring the backed-up exam data) refer to Chapter *“Sonoview”* in the Basic User Manual of Voluson i / Voluson e.

Section 4-6
Software Configuration Checks

4-6-1 System Setup

Press the **UTILITIES** key and select the SYSTEM item from the “Utilities” menu - which is shown in the menu area on the left side of the screen. The System Setup desktop offers different pages to check:

Table 4-10 Software Configuration (System Setup) Checks

Step	Task	Expected Result(s)
1	General: Check Date and Time setting	Date and Time are correct
2	General: Check that Location (Clinic Name) is correct	Location Name is correct
3	General: Check Language settings	desired Language is displayed
4	General: Check EUM Language settings	desired EUM Language is displayed
5	General: Check “Display” settings	“Display” settings assigned as desired by the customer
6	User Settings: Adjust/check “LCD Brightness”	setup displays a complete gray scale
7	User Settings: Check settings of the “Patient ID” fields	settings assigned as desired by the customer
8	User Setting: Check all the User Settings	settings assigned as desired by the customer
9	P1-P2-P3: Check assignment of the [Print] tab	settings assigned as desired by the customer
10	P1-P2-P3: Check assignment of the [Save] tab	settings assigned as desired by the customer
11	P1-P2-P3: Check assignment of the [Export] tab	settings assigned as desired by the customer
12	Option: Check that all options are set up correct	D = Demo , I = Inactive , P = Permanent
13	Network: Check DICOM®, Sonoview and Network configuration	settings assigned as desired by the customer

4-6-2 Measure Setup

Press the **UTILITIES** key and select the MEASURE item from the “Utilities” menu - which is shown in the menu area on the left side of the screen.
The Measure Setup desktop offers three different pages to check.

NOTICE Parameters and possible adjustments depend on the selected Application.
To view, add, delete, reorder, edit or when creating a new parameter (in the **MEASURE & CALC** page), it is very important that all items are chosen correctly and that the relevant item is highlighted.

For further information refer to Chapter 17 in the Basic User Manual of Voluson i / Voluson e.

Table 4-11 Measurement Setup Checks

Step	Task	Expected Result(s)
1	Measure & Calc: Check all settings for all applications	setting assigned as desired by the customer
2	Application Parameters: Check all settings for all applications	setting assigned as desired by the customer
3	Global Parameters: Check all settings	setting assigned as desired by the customer

Section 4-7
Peripheral Checks

Check that peripherals work as described below:

Table 4-12 Peripheral Checks

Step	Task to do	Expected Result(s)
1	Press the **FREEZE** key.	Stop image acquisition.
2	Press the **P1**, **P2** and/or **P3** key on the Control Panel.	The image displayed on the screen is printed, saved or exported, depending on the key assignment configuration

4-7-1 Power Supply Adjustment

There are no adjustments on the power supplies. The DC Power is self-regulated. If a voltage is outside the specified range, it means that something is wrong, either with the power supply itself or with a component connected to that specific power outlet.

Section 4-8
Site Log

Table 4-13 Voluson i / Voluson e - Site Log (Paper Documentation)

Date	Service person	Problem	Comments

Chapter 5

Components and Functions (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains Voluson i / Voluson e’s system concepts, component arrangement, and subsystem function. It also describes the Power Distribution System (PDS) and probes.

Table 5-1 Contents in Chapter 5

Section	Description	Page Number
5-1	Overview	5-1
5-2	General Information	5-2
	Section 5-2-1 "Description of Voluson i / Voluson e Operating Modes"	5-5
	Section 5-2-2 "3D/4D Imaging"	5-7
	Section 5-2-3 "Block diagram Voluson i / Voluson e"	5-8
	Section 5-2-4 "Dataflow Control Description"	5-9
	Section 5-2-5 "Description of Software Options"	5-12
5-3	Front End Processor	5-18
5-4	Back End Processor	5-21
5-5	Power Supply Unit	5-28
5-6	Keyboard and Control Panel	5-35
5-7	Display Module and LCD Monitor	5-41
5-8	Peripherals	5-42
5-9	External I/O	5-43
5-10	Air Flow Control	5-44
5-11	Service Platform	5-45
5-13	Service Page	5-52

Section 5-2
General Information

The Voluson i / Voluson e is a compact, fully portable, digital beamforming curved and linear array ultrasound imaging scanner. Weighing only 5 kg / 11 lbs. (without peripherals), this laptop-style system is extremely versatile. Depending upon the installed software, it can be used for various applications.

The system can be used for:

- 2D Mode
- M Mode + MCFM Imaging (Color Flow and M Mode)
- Color Doppler Imaging (CFM - Color Flow Mode and PD - Power Doppler)
- Doppler (PW)
- Static 3D and 4D Real Time Imaging (optional)
- Different combinations of the above modes

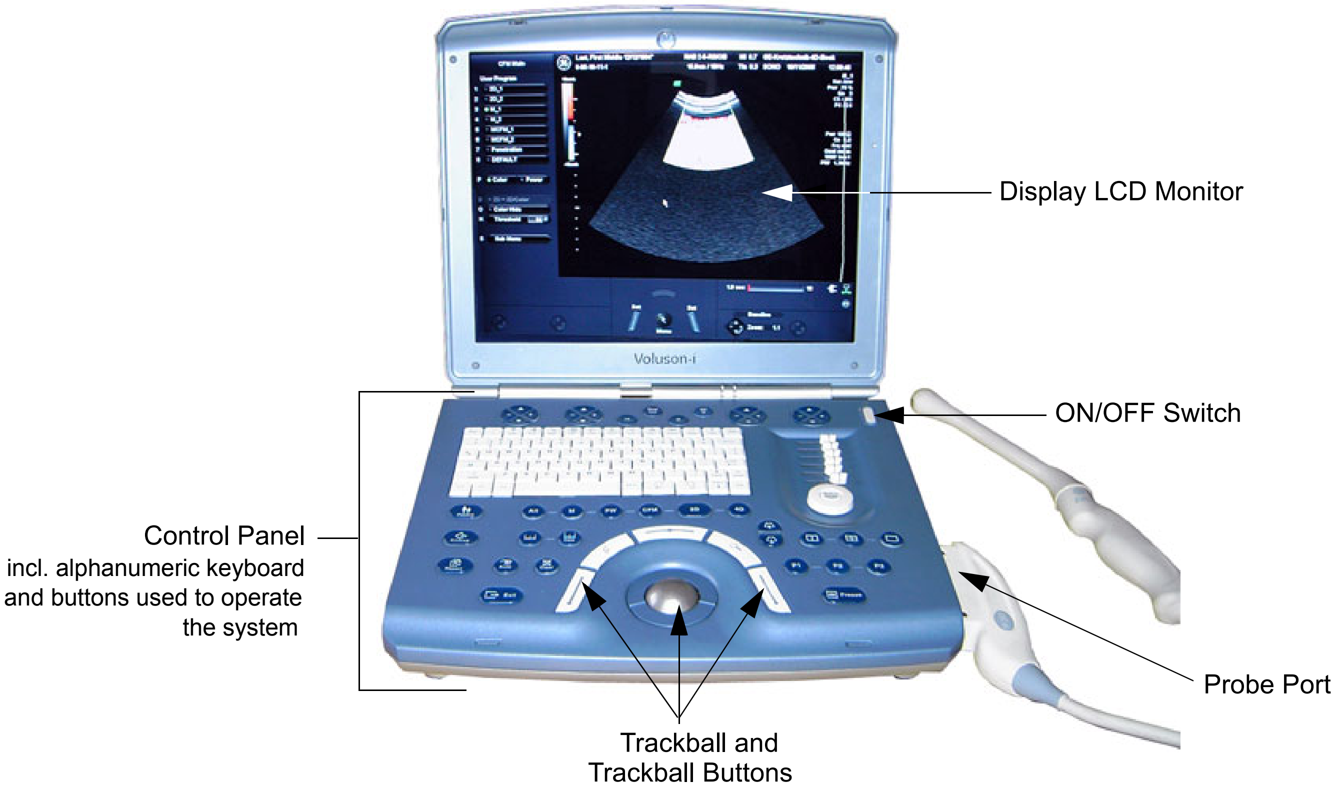

Display LCD Monitor
ON/OFF Switch
Control Panel
incl. alphanumeric keyboard
and buttons used to operate
the system
Probe Port
Trackball and
Trackball Buttons

Figure 5-1 Voluson i / Voluson e Major Components

The Voluson i / Voluson e technology includes advanced power management based on SMBus (System Manager Bus) and ACPI (Advanced Configuration and Power Interface).
The various power options include:

- Rechargeable Battery (internal/external)
- AC/DC Power Supply (auto-sensing)
- Docking Unit

The system is equipped with a highly efficient power supply, resulting in low power consumption and minimal acoustical noise.

Section 5-2 General Information (cont'd)

Among other significant features of the Voluson i / Voluson e portable ultrasound system are the following:

- Integrated, low-power Front End (uses advanced ASIC and FGPA technologies).
- Open connectivity using dual PCMCIA interface and USB
- Bluetooth - wireless connectivity
- Low power (less than 8W), high performance 15" LCD monitor (with fully adjustable contrast and viewing angle)
- Low profile, backlit Keyboard

The Voluson i / Voluson e has a digital beam forming system (incorporated in the Front End) which can handle up to 192 element linear probes by use of multiplexing.

Signal flow travels from the Probe Connector Panel, to the Front End (FE) Electronics, to the Back End Processor (BEP), and finally is displayed on the LCD monitor and peripherals.

Voluson i / Voluson e internal electronics are divided into three:

- Front End (FE) Processor
- Back End Processor (BEP)
- Power Supply Unit

Interconnecting signals from the FEP, BEP, keyboard, monitor, and power distribution sub-systems are routed internally.

Major System Components:

The main functional blocks in the Voluson i / Voluson e system are listed below, and described in detail in this chapter, as follows:

- Front-End processor, see: Section 5-3 on page 5-18
- Back-End processor, see: Section 5-4 on page 5-21
- Primary Power Supply and Rechargeable Battery, see: Section 5-5 on page 5-28
- Keyboard and Control Panel, see: Section 5-6 on page 5-35
- Display Module and LCD Monitor, see: Section 5-7 on page 5-41
- Peripherals, see: Section 5-8 on page 5-42
- External I/O, see: Section 5-9 on page 5-43

Section 5-2 General Information (cont'd)

The Voluson i / Voluson e uses digital beamforming technology which provides high resolution and high penetration performance. It is a general purpose, software controlled diagnostic portable ultrasound scanner. Its function is to acquire ultrasound data and to display the data of different modes.
Voluson i / Voluson e gives the operator the ability to measure anatomical structures and offers analysis packages that provide information that is used to make a diagnosis by competent health care professionals.

The Calculation and Report function supports following application packages:

- Abdomen (ABD)
- Obstetrics (OB)
- Gynecology (GYN)
- Cardiology (CARD)
- Urology (URO)
- Vascular (VAS)
- Neurology (NEURO)
- Small Parts (SM P)
- Pediatrics (PED)
- Orthopedics (ORTHO)

The Voluson i / Voluson e supports a variety of linear- and curved array probes for various clinical applications.

Medical application fields include:

- Obstetrics
- Gynecology and Fertility
- Radiology
- Internal Medicine
- Neurology
- Cardiology
- Oncology
- Urology
- Orthopedics
- Pediatrics

The system is designed for follow-up expansion.

In addition to the initial operational settings for each transducer pre-programmed in the system, user-customized parameter settings for each transducer may be inserted by the operator and stored for recall as needed via the system control panel. System configuration is stored on the hard drive and all necessary software is loaded from the hard drive on power up.
The user initiates system operation via the control panel and the alphanumeric keyboard.

Biopsy guidelines are provided on screen to assist in the collection of tissue samples, using biopsy guide adapters offered as an optional accessory.

The system provides the ability to perform remote viewing of images without compression, via DICOM® 3.0 compatible output. Management of patient history is possible by “Sonoview” image-filing function. High-resolution images are provided by utilizing a technology called digital dynamic receive focusing.

For more detailed explanations of functions and controls refer to the Basic User Manual.

5-2-1 Description of Voluson i / Voluson e Operating Modes

5-2-1-1 B-Mode or 2D-Mode

B-Mode or 2D-mode is a two-dimensional image of the amplitude of the echo signal. It is used for location and measurement of anatomical structures and for spatial orientation during operation of other modes. In 2D-mode, a two-dimensional cross-section of a three-dimensional soft tissue structure such as the heart is displayed in real time. Ultrasound echoes of different intensities are mapped to different gray scale or color values in the display. The outline of the 2D cross-section may be a rectangle, parallelogram, sector or 360-degree circle, depending on the particular transducer used.
2D-mode can be used in combination with any other mode.

5-2-1-1-1 Coded Harmonic Imaging (HI)

In Harmonic Imaging, acoustic aberrations due to tissue are minimized by receiving and processing the second harmonic signal that is generated within the insonified tissue. Voluson i / Voluson e´s high performance HI provides superb detail resolution and penetration, outstanding contrast resolution, excellent acoustic clutter rejection and an easy to operate user interface.
Coded Harmonics enhances near field resolution for improved small parts imaging as well as far field penetration. It diminishes low frequency amplitude noise and improves imaging technically difficult patients. It may be especially beneficial when imaging isoechoic lesions in shallow-depth anatomy in the breast, liver and hard-to-visualize fetal anatomy.
Coded Harmonics may improve the B-Mode image quality without introducing a contrast agent.

5-2-1-2 M-Mode

In M-mode, soft tissue structure is presented as scrolling display, with depth on the Y-axis and time on the X-axis. It is used primarily for cardiac measurements such as value timing on septal wall thickness when accurate timing information is required. M-mode is also known as T-M mode or time-motion mode. Ultrasound echoes of different intensities are mapped to different gray scale values in the display.
M-mode displays time motion information of the ultrasound data derived from a stationary beam. Depth is arranged along the vertical axis with time along the horizontal axis. M-mode is normally used in conjunction with a 2D image for spatial reference. The 2D image has a graphical line (M-line) superimposed on the 2D image indicating where the M-mode beam is located.

5-2-1-2-1 MCFM Mode (M Mode + Color Flow Mode)

Color Flow Mode and Color M Mode are Doppler modes intended to add color-coded qualitative information concerning the relative velocity and direction of fluid motion within the 2D mode or M mode image. Color Flow overlays color on the M mode trace using velocity and variance color maps. The Color Flow wedge overlays the 2D mode image and M mode time line.

5-2-1-3 Color Doppler Mode

Color Doppler is used to detect motion presented as a two-dimensional display.
There are two applications of this technique:

- Color Flow Mode (C) - used to visualize blood flow velocity and direction
- Power Doppler (PD) - used to visualize the spatial distribution of blood

5-2-1-3-1 Color Flow Mode

A real-time two-dimensional cross-section image of blood flow is displayed. The 2D cross-section is presented as a full color display, with various colors being used to represent blood flow (velocity, variance, power and/or direction). Often, to provide spatial orientation, the full color blood flow cross-section is overlaid on top of the grayscale cross-section of soft tissue structure (2D echo). For each pixel in the overlay, the decision of whether to display color (Doppler), gray scale (echo) information or a blended combination is based on the relative strength of return echoes from the soft tissue structures and from the red blood cells. Blood velocity is the primary parameter used to determine the display colors, but power and variance may also used. A high pass filter (wall filter) is used to remove the signals from stationary or slowly moving structures. Tissue motion is discriminated from blood flow by assuming that blood is moving faster than the surrounding tissue, although additional parameters may also be used to enhance the discrimination. Color flow can be used in combination with 2D and Spectral Doppler modes as well as with 3D mode.

5-2-1-3-2 Power Doppler

A real-time two dimensional cross-section of blood flow is displayed. The 2D cross-section is presented as a full color display, with various colors being used to represent the power in blood flow echoes. Often, to provide spatial orientation, the full color blood flow cross-section is overlaid on top of the gray scale cross-section of soft tissue structure (2D echo). For each pixel in the overlay, the decision of whether to display color (Doppler power), gray scale (echo) information or a blended combination is based on the relative strength of return echoes from the soft-tissue structures and from the red blood cells. A high pass filter (wall filter) is used to remove the signals from stationary or slowly moving structures. Tissue motion is discriminated from blood flow by assuming that blood is moving faster than the surrounding tissue, although additional parameters may also be used to enhance the discrimination. The power in the remaining signal after wall filtering is then averaged over time (persistence) to present a steady state image of blood flow distribution. Power Doppler can be used in combination with 2D and Spectral Doppler modes as well as with 3D mode.

5-2-1-4 Pulsed (PW) Doppler

PW Doppler processing is one of two spectral Doppler modalities, the other being CW Doppler. In spectral Doppler, blood flow is presented as a scrolling display, with flow velocity on the Y-axis and time on the X-axis. The presence of spectral broadening indicates turbulent flow, while the absence of spectral broadening indicates laminar flow. PW Doppler provides real time spectral analysis of pulsed Doppler signals. This information describes the Doppler shifted signal from the moving reflectors in the sample volume. PW Doppler can be used alone but is normally used in conjunction with a 2D image with an M-line and sample volume marker superimposed on the 2-D image indicating the position of the Doppler sample volume. The sample volume size and location are specified by the operator. Sample volume can be overlaid by a flow direction cursor which is aligned, by the operator, with the direction of flow in the vessel, thus determining the Doppler angle. This allows the spectral display to be calibrated in flow velocity (m/sec.) as well as frequency (Hz). PW Doppler also provides the capability of performing spectral analysis at a selectable depth and sample volume size. PW Doppler can be used in combination with 2D and Color Flow modes.

5-2-2 3D/4D Imaging

The Voluson i / Voluson e Ultrasound System will be used to acquire multiple, sequential 2D images which can be combined to reconstruct a three dimensional image. These 3D images are useful in visualizing three-dimensional structures, and in understanding the spatial or temporal relationships between the images in the 2D sequence. The 3D image is presented using standard visualization techniques, such as surface or volume rendering.

5-2-2-1 3D Data Collection and Reconstruction

2D gray scale images including Color Flow or Power Doppler information may be reconstructed. The acquisition of volume data sets is performed by sweeping 2D-scans with special transducers (called 3D-transducers) designed for the 2D-scans and the 3D-sweep.

2D ultrasound imaging modes are used to view a two dimensional cross-sections of parts of the body. For example in 2D gray scale imaging, a 2 dimensional cross-section of a 3-dimensional soft-tissue structure such as the heart is displayed in real time. Typically, the user of an ultrasound machine manipulates the position and orientation of this 2D cross-section in real time during an ultrasound exam.

By changing the position of the cross-section, a variety of views of the underlying structure are obtained, and these views can be used to understand a 3-dimensional structure in the body.

To completely survey a 3-dimensional structure in the body, it is necessary to collect 2D images which span a volume containing the structure. One way is to sweep the imaging cross-section by translating it in a direction perpendicular to the cross-section. Another example method is to rotate the cross section about a line contained in the cross section. The Voluson i / Voluson e Ultrasound System uses the automated so called C-Scan for the motion perpendicular to automated B-scan. Once a representative set of 2D cross-sections are obtained, standard reconstruction techniques can be used to construct other 2D cross-sections, or to view the collection of the cross-sections as a 3D images.

5-2-2-2 3D Image Presentation

Several techniques can be used to aid the human observer in understanding the resulting 2D image as a representation of a three-dimensional object. One is to rotate the volume of data, and present the resulting sequence of 2D projections to the observer. The changing direction of observation helps the observer to separate the features in the volume according to their distance from the observer.

5-2-2-3 3D Rendering

The 3D (volume) rendering is a calculation process to visualize certain 3D-structures of a scanned volume by means of a 2D-image. The gray value for each pixel of the 2D-image is calculated from the voxels along the corresponding projection path (analyzing beam) through the volume. The render (calculation) algorithm, surface or transparent mode, determines how 3D-structures are visualized.

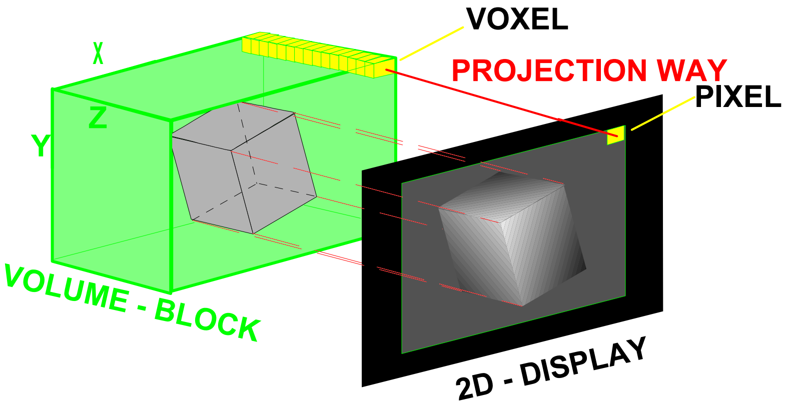


Figure 5-2 Principle: Volume Rendering

5-2-3 Block diagram Voluson i / Voluson e

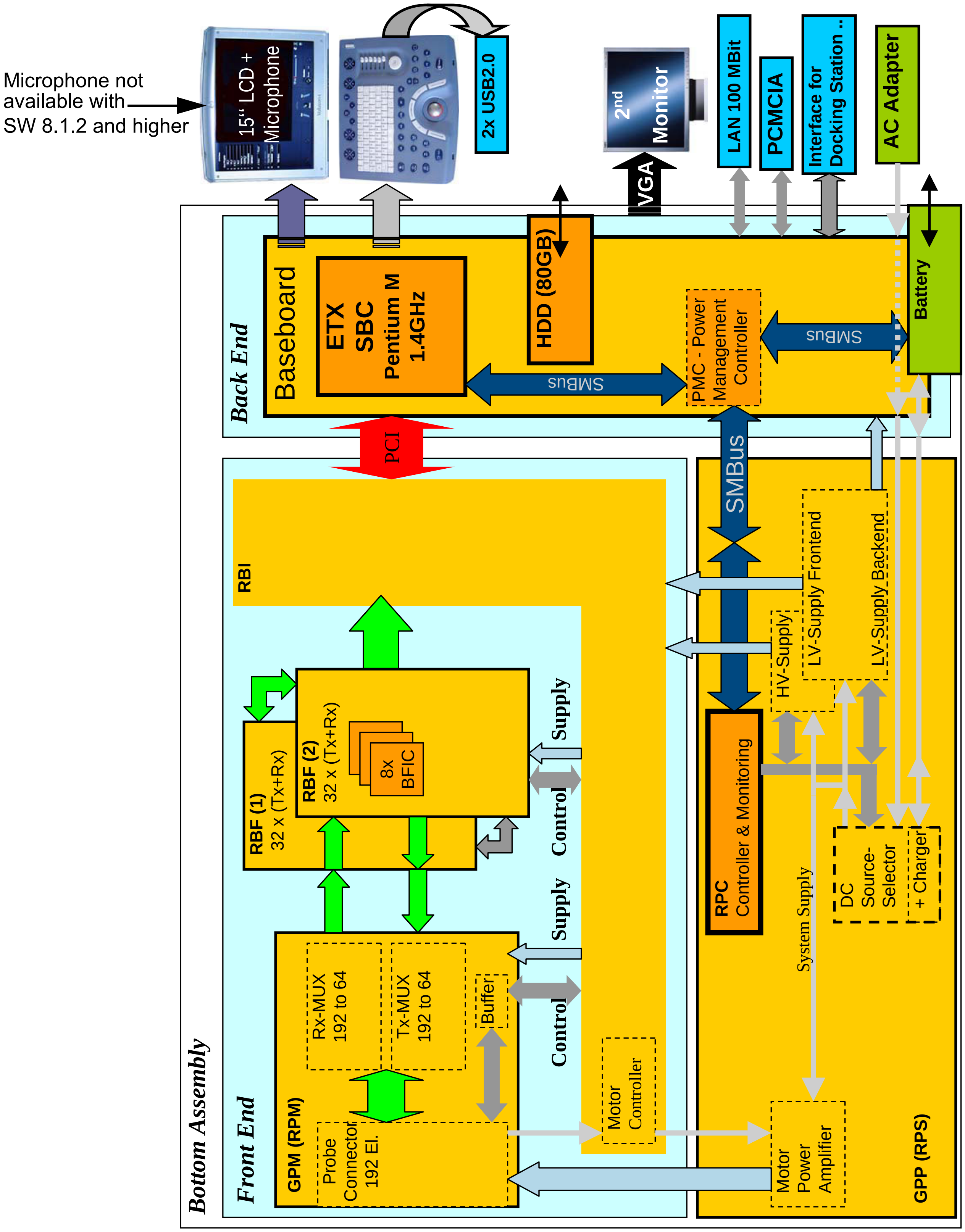

Microphone not available with SW 8.1.2 and higher
15" LCD + Microphone
2x USB2.0
2nd Monitor
VGA
LAN 100 MBit
PCMCIA
Interface for Docking Station ..
AC Adapter
Battery
Back End
Baseboard
ETX SBC Pentium M 1.4GHz
HDD (80GB)
SMBus
PMC - Power Management Controller
SMBus
PCI
SMBus
RBI
RBF (1) 32 x (Tx+Rx)
RBF (2) 32 x (Tx+Rx)
8x BFIC
Supply
Control
Supply
Control
GPM (RPM)
Rx-MUX 192 to 64
Tx-MUX 192 to 64
Buffer
Probe Connector 192 El.
Motor Controller
Front End
Bottom Assembly
LV-Supply Frontend
LV-Supply Backend
HV-Supply
RPC Controller & Monitoring
System Supply
DC Source-Selector
+ Charger
Motor Power Amplifier
GPP (RPS)

Figure 5-3 Top Level Architecture

5-2-4 Dataflow Control Description

This section describes functions of Voluson i / Voluson e Boards vs different Operation Modes.

- RBF - Transmitter/Receiver “Beamformer” Board
- RBI - Radio Frequency “Controller” Board

5-2-4-1 B-Mode

1.) RBI

The RBI board contains the Clock-Oszillator(60MHz) and PRF-Generator.
It generates(drives) BF(=Beamformer)-ASIC-Clock(60MHz) and Shot-Trigger for the RBF.
Configures RPM (Probe & MUX board) and Beamformer with TX-Frequ, TX-Focus, RX-Focus, LineNo (lateral Position), TX- Apodisation, RX-Apodisation, Multibeam, etc.
RBI also contains the TX-Power-Reference-DAC.

Furthermore it contains Multibeam-DeInterleave, Subtraction Filter (for HI-Mode, see: Section 5-2-4-1-1 "Special B Mode Techniques" on page 5-10), DigitalTGC, DC-Canceler, Mixer (Part of Demodulator), LowPassFilter, Decimation (Pixelrate Conversion), MagnitudeCalculator (Part of Demodulator), Logarithmic Amplifier, Re-Sample, Edge Enhance (Contrast Enhancement through differentiation), LineFilter, Blending (adapting Brightness in order to perfectly combine Nearfield-Frame with Farfield-Frame, FrameFilter.

Multibeam-DeInterleave means: Incoming Pixelorder
shot1**pix1**-shot2**pix1**-shot3**pix1**-shot4**pix1** -
shot1**pix2**-shot2**pix2**-shot3**pix2**-shot4**pix2**...
is converted to the new order:
shot1pix1-**shot1**pix2-**shot1**pix3..... - **shot2**pix1-**shot2**pix2-**shot2**pix3.....

After DC-cancelling the signal is mixed with RX-Frequency and brought to LF-Spectrum, where the LowPassFilter cuts HF. Mixer and Magnitude-Calculator arrange Complex Demodulation, and Logarithmic Amplifier arrange the conversion from High-Dynamic LinearSignal to the Low-Dynamik(e.g.8Bit) Log-Signal. Several Postprocessing steps (LineFilter, FrameFilter, ReSample, Edge Enhance) enable smooth image quality while keeping contrast high.

a.) Direct Memory Access (DMA) section:

B-mode-Data from RBI is written via Signal Processor (SP) Channel 0 into SDRAM Fifo Buffer memory. DMA Controller 0 transfers the data into PC main memory where scan conversion is performed per software.
Cine Mode: Reserved area in PC main memory is used.

2.) RBF

The RBF consists of Beamformer-ASIC, TX-Amplifier, RX-TGC-Amplifier, Signal-ADC.
Each RBF (**2** boards) can support 32 TX-Channels and 32 RX-Channels.

- TX-Channel: ASIC generates TX-Freq through dividing 60MHz by 2,3,4,5,... and TX-Focus.
- RX-Channel: ASIC generates Sample-Clocks for the ADC, manages RX-Focus (Delay and Chain-Adder) and Apodization.

3.) Video Section

The result is transferred to PC standard video logic, where the analog VGA signals for the monitor and standard video timing outputs for LCD display are generated.

5-2-4-1-1 Special B Mode Techniques

a.) **HI** (Coded Harmonic Imaging)
In one method of HI the RX-Frequency is doubled, so that the radial resolution is increased due to the higher RX-Frequency.
The second method of HI is pulse-inversion: 2 TX-Beams are shot to the same Tissue-location, one with positive, one with negative polarity. The subtraction of both shots (Subtraction Filter) brings to bear the nonlinear-echo-reflection-properties of the tissue, which is very useful with extremely difficult-to-image patients.

5-2-4-2 M-Mode

1.) RBI

see: 5-2-4-1 B-Mode

a.) DMA section

B-mode-Data from RBI is written via SP0 into SDRAM Fifo Buffer memory. DMA Controller 1 transfers the data into PC main memory where scan conversion is performed per software, i.e. the sweep image is generated (scaling and interpolation between lines).
CineMode: CineMode-Memory is the PC main memory.

2.) RBF

see: 5-2-4-1 B-Mode

5-2-4-3 D-Mode (Pulsed Wave Doppler)

1.) RBI

- PRF-generator; see: 5-2-4-1 B-Mode
- After DC-cancelling the signal is mixed with RX-Frequency and brought to LF-Spectrum, where the LowPassFilter cuts HF.
  Mixer and Magnitude-Calculator arrange Complex Demodulation.

a.) DMA section

D-mode-Data from RBI is written via SP1 into SDRAM Fifo Buffer memory. DMA Controller 1 transfers the data into PC main memory where scan conversion is performed per software, i.e. the sweep image is generated (scaling and interpolation between lines).
CineMode: CineMode-Memory is the PC main memory.

2.) RBF

see: 5-2-4-1 B-Mode

5-2-4-4 D-Mode Autotrace (draws PC-calculated envelope to D-Spectrum)

1.) RBI
   - PRF-generator; see: 5-2-4-1 B-Mode
   - After DC-cancelling the signal is mixed with RX-Frequency and brought to LF-Spectrum, where the LowPassFilter cuts HF.
     Mixer and Magnitude-Calculator arrange Complex Demodulation.

   a.) DMA section

   D-mode-Data from RBI is written via SP1 into SDRAM Fifo Buffer memory.
   PC calculates Autotrace-Curve from D-Mode data.
   Cine Mode with Autotrace: Cine Mode-Memory for the Autotrace-Curve is inside PC-Memory. Software has to take care that D-Spectrum and Autotrace-Curve are placed exactly one upon the other, means: have the same Cine-Shift.

2.) RBF

see: 5-2-4-1 B-Mode

5-2-4-5 CFM-Mode (Color Flow Mode)

1.) RBI
   - PRF-generator; see: 5-2-4-1 B-Mode
   - After DC-cancelling the signal is mixed with RX-Frequency and brought to LF-Spectrum, where the LowPassFilter cuts HF.
     Mixer and Magnitude-Calculator arrange Complex Demodulation.

   a.) DMA section

   see: 5-2-4-1 B-Mode

2.) RBF

see: 5-2-4-1 B-Mode

3.) Video Section

see: 5-2-4-1 B-Mode

5-2-4-6 3D-Mode (Freezes after 1 volume sweep)

see: 5-2-4-1 B-Mode

5-2-4-7 Real Time 4D-Mode (nonstop volume rendering)

see: 5-2-4-1 B-Mode

5-2-4-8 Sonoview write mode (store Image to Sonoview)

1.) RBI

Not used

   a.) DMA section

   Not used

2.) RBF

Not used

3.) Video Section

standard PC video logic

5-2-5 Description of Software Options

To activate software options:

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.

2.) Select the SYSTEM item from the menu area and then select the OPTION page.

Table 5-2 Software Options at Voluson i

	SW-Option at Voluson i	Description
1	Volume Ultrasound (3D Mode, Real Time 4D, VOCAL and TUI)	3D Mode Real Time 4D VOCAL* - Virtual Organ Computer-aided Analysis TUI* - Tomographic Ultrasound Imaging
1	VOCAL	VOCAL* - Virtual Organ Computer-aided Analysis seperat option on BT´09
2	Interface for DICOM® 3 Standard	DICOM®
3	VCI	VCI - Volume Contrast Imaging **Note:** The option “VCI” is only available if the option “Volume Ultrasound” is also enabled.
4	RT 4D Biopsy	Real Time 4D-Biopsy **Note:** The option “4D Biopsy” is only available if the option “Volume Ultrasound” is also enabled.
5	XTD-View	XTD-View (Extended View).
6	SonoAVC	SonoAVC - Sono Automated Volume Count
7	SonoVCAD heart	SonoVCAD Heart- Computer Assisted Heart Diagnosis Package
8	SonoVCAD labor	SonoVCAD labor
9	STIC	STIC (Spatio-Temporal Image Correlation)
10	SonoNT	SonoNT
11	SonoRS	Sono Render Start

BT Version: The options “RT 4D Biopsy”, “VCI” and “XTD-View” are only applicable at Voluson i systems with BT´07 software and higher.

BT Version: The options “SonoAVC”, “SonoVCAD” and “STIC” are only applicable at Voluson i systems with BT´09 software. VOCAL seperat option on BT09.

BT Version: The options “SonoNT” and “SonoRS” are only applicable at Voluson i systems with BT’11 software.

5-2-5 Description of Software Options (cont'd)

Table 5-3 Software Options at Voluson e

	SW-Option at Voluson e	Description
1	DICOM® 3 (Interface for DICOM® 3 Standard)	DICOM®
2	4D Basic (4D rendering only!)	Real Time 4D (4D rendering only, no 3D Mode and no access to volume data)
3	3D/4D Advanced (3D Mode and Real Time 4D).	3D Mode Real Time 4D **Note:** The option "3D/4D Advanced" is only available if the option "4D Basic" is also enabled.
4	RIC Probe	**Note:** The Real time 4D endocavity probe (RIC5-9RS) is only applicable if this option is enabled.
5	RO	**Note:** The RAB-Probes are only applicable if this option is enabled.
6	XTD-View	XTD-View (Extended View)
7	SonoVCAD labor	SonoVCAD labor
8	SonoAVC	SonoAVC - Sono Automated Volume Count
9	SonoNT	SonoNT
10	SonoRS	Sono Render Start

BT Version: The options "SonoVCAD labor" and "SonoAVC" are only applicable at Voluson i / Voluson e systems with BT´09 software.

BT Version: The options "SonoNT" and "SonoRS" are only applicable at Voluson e systems with BT'11 software.

NOTE: Additional options are not yet implemented in the Voluson i / Voluson e.

5-2-5-1 3D Mode

refer to: Section 5-2-2 "3D/4D Imaging" on page 5-7

5-2-5-2 Real Time 4D

Real Time 4D mode is obtained through continuous volume acquisition and parallel calculation of 3D rendered images. In Real Time 4D mode the volume acquisition box is at the same time the render box. All information in the volume box is used for the render process. In Real Time 4D mode a “frame rate” of up to 25 volumes/second at Voluson i (up to 15 volumes/second at Voluson e) is possible.
By freezing the acquired volumes, size can be adjusted, manipulated manually as known from the Voluson 3D Mode.

The Voluson i / Voluson e portable ultrasound system supports two 4D Operation Modes.

5-2-5-2-1 Classic Mode

Advanced Mode with dedicated Voluson Volume features

5-2-5-2-2 Smart 4D Mode

Easy/Speedy operation with as few controls as possible;
especially designed for 4D beginners and users who want quick surface renderings.

5-2-5-3 VOCAL* - Virtual Organ Computer-aided Analysis

Diagnosis and therapy of cancer is one of the most important issues in medical care.
The VOCAL - Imaging program allows completely new possibilities in cancer diagnosis, therapy planning and follow-up therapy control.

VOCAL offers different functions:

- Manual Contour detection of structures (such as tumor lesion, cyst, prostate, etc.) and subsequent volume calculation.
  The accuracy of the process can be visually controlled by the examiner in multi-planar display.
- Construction of a virtual shell around the contour of the lesion. The wall thickness of the shell can be defined. The shell can be imagined as a layer of tissue around the lesion, where the tumor vascularization takes place.
- Automatic calculation of the vascularization within the shell by 3D color histogram by comparing the number of color voxels to the number of grayscale voxels.

⚠ **NOTICE** The option “VOCAL” is not available for **Voluson e** systems (marked with ***** in this manual).

5-2-5-4 TUI* - Tomographic Ultrasound Imaging

TUI is a new visualization mode for 3D and 4D data sets. The data is presented as slices through the data set which are parallel to each other. An overview image, which is orthogonal to the parallel slices, shows which parts of the volume are displayed in the parallel planes. This method of visualisation is consistent with the way other medical systems such as CT or MRI, present the data to the user.
The distance between the different planes can be adjusted to the requirements of the given data set. In addition it is possible to set the number of planes. The planes and the overview image can also be printed to a DICOM® printer, for easier comparison of the ultrasound data with CT and/or MRI data.

⚠ **NOTICE** The option “TUI” is not available for **Voluson e** systems (marked with ***** in this manual).

5-2-5-5 DICOM®

Voluson i / Voluson e software package providing following DICOM® functionality:

- Storage Service Class
- Print Management Service Class
- Structured Reporting Service Class
- Storage Commit Service Class
- Modality Performed Procedure Step Service Class

Sending of reports - Additionally all OB/Gyn measurements can be sent to a PC*.
Receiving of these reports is supported by ViewPoint workstation “PIA” only. All other workstations can be adapted individually.

* Without using structured reporting.

5-2-5-6 VCI - Volume Contrast Imaging

Volume Contrast Imaging utilizes 4D transducers to automatically scan multiple adjacent slices and delivers a real-time display of the ROI.
This image results from a special rendering mode consisting of texture and transparency information.
VCI improves the contrast resolution and therefore facilitates finding of diffuse lesions in organs.
VCI has more information (from multiple slices) and is of advantage in gaining contrast due to improved signal/noise ratio.

Static VCI is a part of the VCI option, which allow to apply the contrast enhancing VCI method to 3D data sets after the acquisition.

⇨ **BT Version:** The option “VCI” is only applicable at Voluson i systems with BT´07 software and higher.

5-2-5-7 Real Time 4D-Biopsy

For minimal invasive procedures like biopsies, ultrasound is a widely used method to visualize and guide the needle during puncture. The advantage in comparison with other imaging methods is the real-time display, quick availability and easy access to any desired region of the patient. The 4D biopsy allows for real time control of the biopsy needle in 3D multi-planar display during the puncture. The user is able to see the region of interest in three perpendicular planes (longitudinal, transversal and frontal section) and can guide the biopsy needle accurately into the centre of the lesion.

⇨ **BT Version:** The option “4D-Biopsy” is only applicable at Voluson i systems with BT´07 software and higher.

5-2-5-8 XTD-View (Extended View)

XTD-View provides the ability to construct and view a static 2D image which is wider than the field of view of a given transducer. This feature allows viewing and measurement of anatomy that is larger than what would fit in a single image. XTD-View constructs the extended image from individual image frames as the operator slides the transducer along the surface of the skin in direction of the scan plane. Examples include scanning of vascular structures and connective tissues in the arms and legs.

⇨ **BT Version:** The option “XTD-View” is only applicable at Voluson i / Voluson e systems with BT´07 software and higher.

5-2-5-9 SonoAVC - Sono Automated Volume Count

This Feature can automatically detect low echogenic objects (e.g., follicles) in a volume of an organ (e.g., ovary) and analyze their shape and volume. From the calculated volume an average diameter can be calculated. It also lists the objects according to their size.

“Separation” is controlling a parameter of the segmentation algorithm that defines an initial threshold to separate objects. Increasing this parameter will prevent objects from being identified as multiple objects (e.g. when there is noise within the object), but might prevent small objects from being found correctly.

“Growth” is controlling a parameter in the segmentation algorithm that defines the final shape of the objects found. Increasing this parameter will allow the objects to fit tighter to the visible boundary. A value too large might cause the objects to grow over the boundary and cover areas no longer part of the objects of interest.

BT Version: The option “SonoAVC” is only applicable at Voluson i / Voluson e systems with´BT´09 software.

5-2-5-10 SonoVCAD Heart- Computer Assisted Heart Diagnosis Package

VCAD is a technology that automatically generates a number of views of the fetal heart to make diagnosis easier. At this time it can help to find the right and left outflow tract of the heart and the fetal stomach.

BT Version: The option “SonoVCAD Heart” is only applicable at Voluson i with BT´09 software.

5-2-5-11 SonoVCAD labor

VCAD labor allows for supervision of labor using specific measurements aided by onscreen orientation marks.

This software has the ability to electronically edit the images, and makes it possible to cut away “3D artifacts”.

BT Version: The option “SonoVCAD labor” is only applicable at Voluson i / Voluson e systems with BT´09 software.

5-2-5-12 STIC (Spatio-Temporal Image Correlation)

With this acquisition method the fetal heart or an artery can be visualized in 4D.
It is not a Real Time 4D technique, but a post processed 3D acquisition.

In order to archive a good result, try to adjust the size of the volume box and the sweep angle to be as small as possible. The longer the acquisition time, the better the spatial resolution will be.
A good STIC, STIC CFM (2D+CFM), STIC PD (2D+PD) or STIC HD (2D+HD-Flow) data set shows a regular and synchronous pumping of the fetal heart or of an artery.

The user must be sure that there is minimal movement of the participating persons (e.g., mother and fetus), and that the probe is held absolutely still throughout the acquisition period. Movement will cause a failure of the acquisition. The acquired images are post processed to calculate a 4D Volume Cine sequence. Please make sure that the borders of the fetal heart or the artery are smooth and there are no sudden discontinuities. If the user (trained operator) clearly recognizes a disturbance during the acquisition period, the acquisition has to be cancelled.

- STIC - Fetal Cardio is only available on RAB & RIC probes in the OB/GYN application.
- STIC - Vascular is only available on the RSP probe in the Peripheral Vascular application.

BT Version: The option “STIC” is only applicable at Voluson i systems with´BT´09 software.

5-2-5-13 SonoNT

SonoNT is an additional function for manual NT (Nuchal Translucency) measurement.
This function supports the user to find the correct position for the NT measurement.
The user can switch between NT Method “Manual” and “Sono NT” (semi-automatic).

A box has to be placed for the NT-ROI. Then the NT-distance is calculated automatically, a graphic (yellow head-image) and the NT-result are displayed.

If no result is found a temporary warning “No valid NT-distance found!” is displayed.

BT Version: The option “SonoNT” is only available at Voluson i / Voluson e systems with SW 8.2.0 release.

5-2-5-14 Sono Render Start

Use Sono Render Start to automatically adjust the render curve to easily separate solid tissue in front of the render object.
The algorithm looks for the transition from liquids to solid tissue.
The Render Box size transverse to the render direction and the Render Box position will not be changed.

BT Version: The option “Sono Render Start” is only available at Voluson i / Voluson e systems with SW 8.2.0 release.

Section 5-3
Front End Processor

5-3-1 General Information

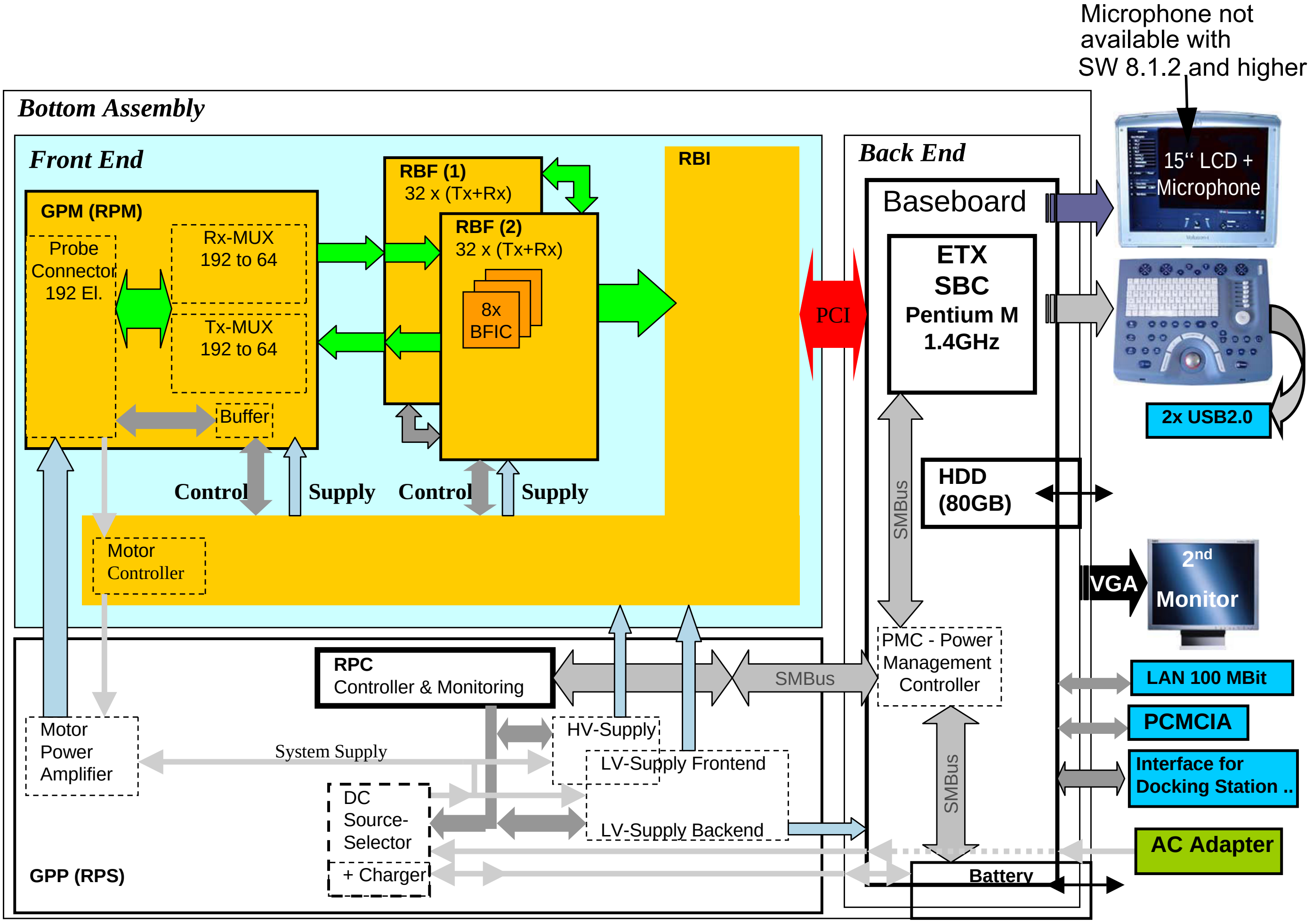

Microphone not available with SW 8.1.2 and higher
Bottom Assembly
Front End
GPM (RPM)
Probe Connector 192 El.
Rx-MUX 192 to 64
Tx-MUX 192 to 64
Buffer
RBF (1) 32 x (Tx+Rx)
RBF (2) 32 x (Tx+Rx)
8x BFIC
RBI
Control
Supply
Control
Supply
Motor Controller
PCI
Back End
Baseboard
ETX SBC Pentium M 1.4GHz
HDD (80GB)
SMBus
PMC - Power Management Controller
SMBus
15" LCD + Microphone
2x USB2.0
VGA
2nd Monitor
LAN 100 MBit
PCMCIA
Interface for Docking Station ..
AC Adapter
Battery
RPC Controller & Monitoring
SMBus
HV-Supply
LV-Supply Frontend
LV-Supply Backend
Motor Power Amplifier
System Supply
DC Source-Selector
+ Charger
GPP (RPS)

Figure 5-4 Front End - Block diagram

The Voluson i / Voluson e Front End (see diagram in Figure 5-4, above) can be divided into two subsystems:

*1.) **MID PROCESSOR SUBSYSTEM** which includes:*

- **RBI Board** (Radio Frequency and tissue processing)
  For detailed description, see: Section 5-3-2 on page 5-19.

*2.) **FRONT END SUBSYSTEM** which includes:*

- **RBF Board(s)** (each board includes a 32-channel digital Beamformer)
  For a detailed description, see Section 5-3-3 on page 5-19.
- **RPM (Probe & MUX) Board** (includes HVMUX)
  For a detailed description, see Section 5-3-4 on page 5-20.

5-3-2 Radio Frequency Interface (RBI) Board

The Radio Frequency Interface (RBI) Board combines the following sub-boards and functionalities:

- FEC (Front End Controller)
- RFT (Radio Frequency & Tissue) processor
- IMP (Image Port)

5-3-2-1 Tasks Performed by the RBI Board

- System Master Clock generator
- Transmitter Control
- ATGC Control
- Receive Focusing Control
- Analog Test Signal Generator
- High Voltage Control and supervision
- Probe Sensing
- Control of MUX board and RBF boards

NOTE: *Additional Coax Cable need to be used and connected if system is equipped with GPP5/GPP6 and RBI4 (See connection on GPP and RBI (Figure 5-6, above).*
Not using the cable shows slight PW-mode disturbances. The Coax Cable prevents it.

5-3-3 RBF Boards (Transmitter/Receiver)

The Transmitter/Receiver has 64 channels and is made up of two identical RBF boards.
Each RBF board is a complete 32-channel ultrasound Front End that includes the following features and functions:

- 32 Transmitters
- 32 Receiving channels, T/R switch, Pre-Amp, TGC, ADC
- 32 channel digital Beamformer

5-3-4 Probe and MUX Board (RPM)

The Probe and MUX (multiplexer) Board enables acquisition and processing of signals from and to probes connected to the front panel. The RPM Board has 192 receive/transmit channels, and performs the following functions:

- Receiving the channels and connecting them to the RBF Boards
- Probe connector (mounted via a flex print)
- High voltage MUX that selects 64 out of 192 inputs

Section 5-4
Back End Processor

5-4-1 Introduction

The Back End Processor (BEP) supports the operation of the Voluson i / Voluson e ultrasound unit and is the main controller for the system.

The various components that comprise the Voluson i / Voluson e BEP are described in the following sections:

- ETX SBC Central Processing Unit (CPU) on page 5-22.
- ETX Base Board on page 5-22.
- Bluetooth Module and Antenna on page 5-23.
- Hard Disk on page 5-24.
- 15" LCD Monitor on page 5-27

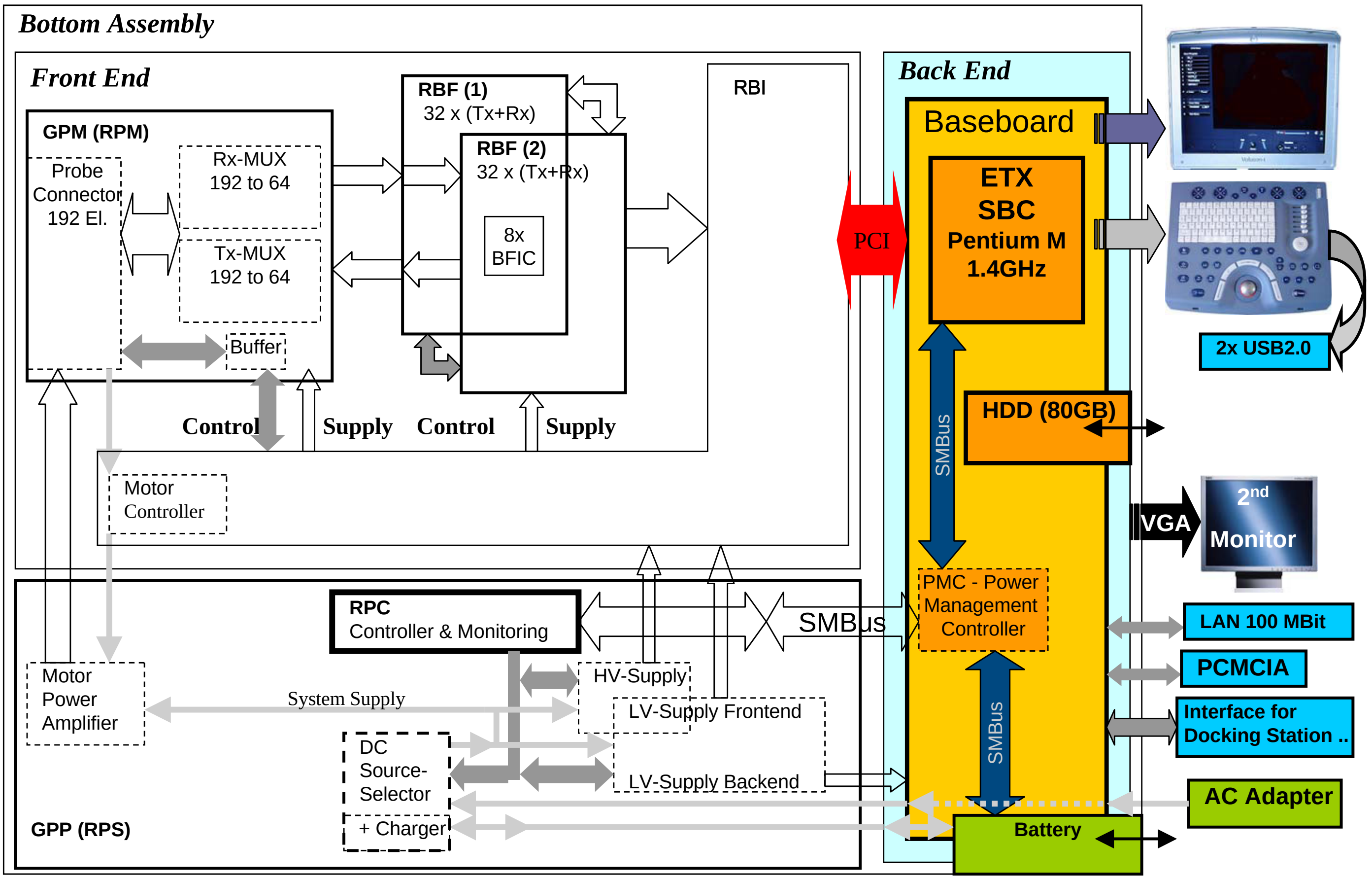

Bottom Assembly
Front End
GPM (RPM)
Probe Connector 192 El.
Rx-MUX 192 to 64
Tx-MUX 192 to 64
Buffer
RBF (1) 32 x (Tx+Rx)
RBF (2) 32 x (Tx+Rx)
8x BFIC
RBI
Control
Supply
Control
Supply
Motor Controller
RPC Controller & Monitoring
SMBus
Motor Power Amplifier
System Supply
HV-Supply
LV-Supply Frontend
LV-Supply Backend
DC Source-Selector
+ Charger
GPP (RPS)
Back End
Baseboard
ETX SBC Pentium M 1.4GHz
PCI
SMBus
HDD (80GB)
PMC - Power Management Controller
SMBus
Battery
2x USB2.0
VGA
2nd Monitor
LAN 100 MBit
PCMCIA
Interface for Docking Station ..
AC Adapter

Figure 5-5 Voluson i / Voluson e Back End Processor - Block Diagram

5-4-2 ETX SBC Central Processing Unit (CPU)

The ETX SBC Central Processing Unit (CPU), which is mounted on top of the ETX Base Board, controls and processes the internal Back End Processor operations.
In addition, the CPU supports the Front End via the PCI bus.

The CPU utilized in the Voluson i / Voluson e ultrasound unit is a Pentium III, 1.4 GHz Processor.

5-4-3 ETX Base Board

5-4-3-1 Overview of ETX Base Board Functions

The ETX Base Board connects all the peripheral modules to the ETX single board computer.
The CPU is mounted on top of the ETX Base Board.

The ETX Base Board provides interfaces to the following components:

- HDD
- PCMCIA modules (PCMCIA only on GPC GPC1-3)
- FrontEnd (RBI) board
- USB ports
- Docking port, speaker phones and speaker jacks
- External VGA monitor
- Fans
- Power supply

A view of the ETX Base Board showing the location of the various connectors is provided in Figure 5-6 on page 5-22.

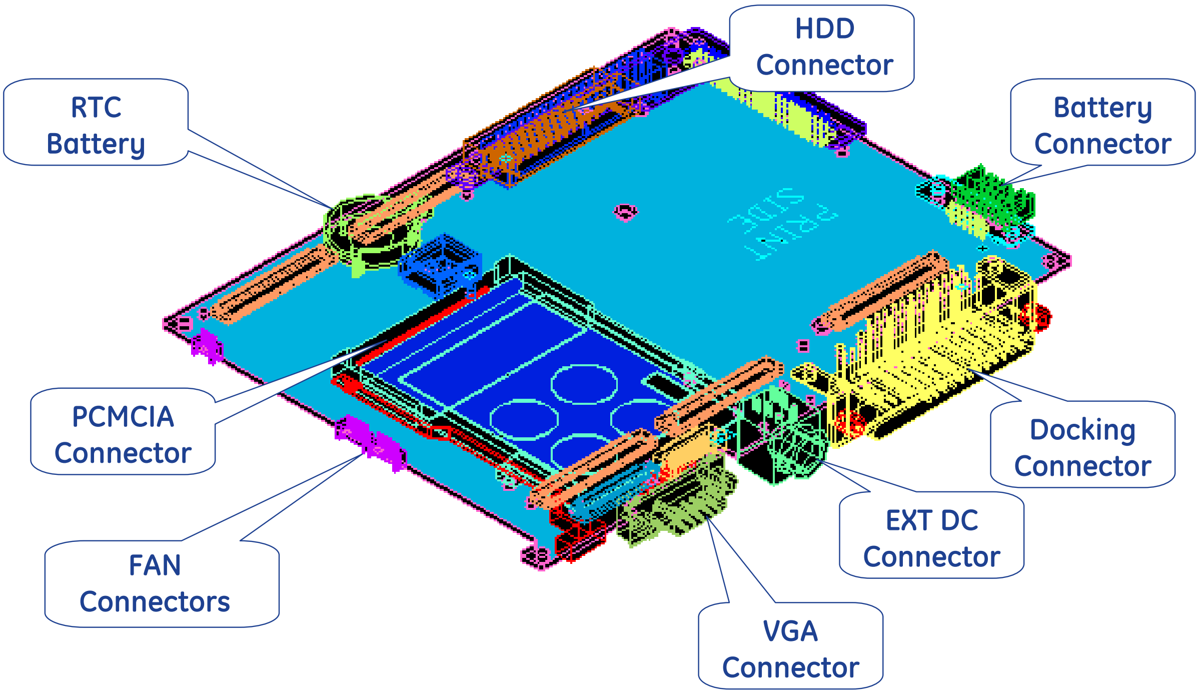

HDD Connector
RTC Battery
Battery Connector
PRINT SIDE
PCMCIA Connector
Docking Connector
EXT DC Connector
FAN Connectors
VGA Connector

Figure 5-6 ETX Base Board (bottom) and Connectors

5-4-3-2 LCD Interface Block

The interface to the LCD is via the LCD JILI interface, designed to provide the following:

- A generic interface to LCD panels
- Backlight illumination control
- Backlight ON/OFF control
- Supports LVDS interface

5-4-3-3 CardBus Interface

The PCMCIA slot supports a single type-II or a single type III Card.

The CardBus controller and Power Interface switch supports hot-plug capability.

5-4-4 Bluetooth Module and Antenna

The Bluetooth Module and Antenna enable the Voluson i / Voluson e portable ultrasound system to operate in a wireless LAN network, which enables the system to connect to external applications, to save or retrieve data from other network clients.

The Bluetooth module is provided through the upper USB port, using an USB-to-Bluetooth adaptor.

5-4-5 Wireless Network Adapter

The Voluson i / Voluson e has wireless capabilities using the Cisco Aironet Wireless LAN Adapter via the PCMCIA port.

5-4-6 Wireless Network Interface

The Voluson i / Voluson e supports a Wireless Network Interface based on industry standards to provide easy-to-use and compatible high-speed wireless connectivity. For details regarding installation, refer to Section 3-5-4 "Connecting the Wireless Network Adapter/Interface" on page 3-43.

The Wireless Network Interface provides a mobile network connection to the local area network.

5-4-7 Hard Disk

The Hard Disk is the main storage device of the Voluson i / Voluson e ultrasound unit.
The Voluson i / Voluson e 80 GB Hard Disk, which is controlled by the CPU via signals from the IDE Bus, is divided into 4 partitions:

C: System partition:

- Operating System (Windows XP or Windows XP embedded), including all Windows settings (IP-address, Network Name, etc.)
- US-Application Software (UIS APP)
- Global Service Platform Software
- Software Options

NOTE: Voluson i / Voluson e with Software 6.x.x and 7.x.x: Operating System is Windows XP.
Voluson i / Voluson e with Software 8.x.x: Operating System is Windows XP embedded.

D: User partition:

- User Presets (Backup) database
- Images (Sonoview), Patient-ID´s and Reports database
- Service database
- System settings database

R: Rescue partition:

- Factory Images of C:Partition for System recovery after HDD (Windows) crash
- Printer Drivers

LINUX partition: (not visible in Windows)

- Linux operating system for rescue functionality

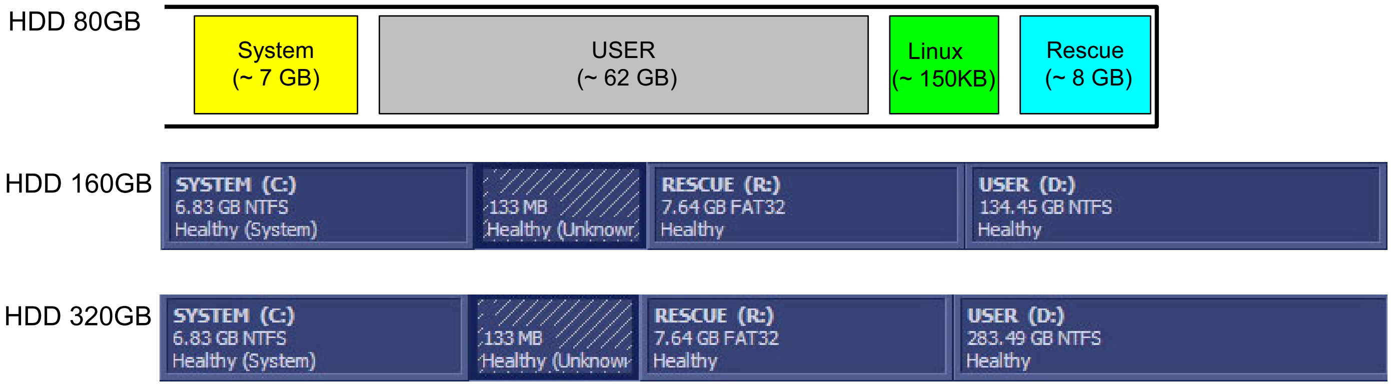

HDD 80GB
System
(~ 7 GB)
USER
(~ 62 GB)
Linux
(~ 150KB)
Rescue
(~ 8 GB)
HDD 160GB
SYSTEM (C:)
6.83 GB NTFS
Healthy (System)
133 MB
Healthy (Unknown
RESCUE (R:)
7.64 GB FAT32
Healthy
USER (D:)
134.45 GB NTFS
Healthy
HDD 320GB
SYSTEM (C:)
6.83 GB NTFS
Healthy (System)
133 MB
Healthy (Unknow
RESCUE (R:)
7.64 GB FAT32
Healthy
USER (D:)
283.49 GB NTFS
Healthy

Figure 5-7 Data Location

5-4-8 Monitoring

The monitoring device is controlled via the SMBus.

5-4-9 Fan Control

All fans have 3 wires with fan speed control input and actual speed output. Only four fans provide actual output; the fifth fan provides only On/Off information. All Fans are powered by +12V.

All 5 fans operate simultaneously and are controlled via one output on the Fan Controller.

5-4-10 Temperature Control

Provides ambient temperature inside the system.

All measured temperature values are accessible from the SMBus.

5-4-11 RTC Battery

The RTC battery provides power to the ETX ‘Real time clock‘.

5-4-12 Power Management Block

The Power Management block provides the functionality described below.

- **Supports Three Power Modes:**
  - Full performance
  - Standby mode
  - Shutdown mode
- **Battery and External AC/DC Source Status Indicators Control**

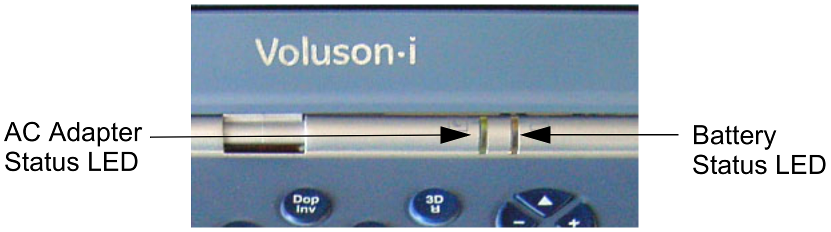


Figure 5-8 Status Indicator LEDs on Voluson i / Voluson e

Two sets of LEDs are provided for the following indications:

- Battery status (Green ‡ High, Orange ‡ Low)
- External AC/DC source status (Green → system is powered from external source)
- In case both or one of the LEDs is flashing, the system is in standby mode.

NOTE: For further details about Indicatons of AC Adapter and Battery Status, refer to Chapter 7 - How to check System Status Indicator LEDs on page 7-6.

- **Power On/Off Buttons**

  Power On/Off Button

  - This is an instantaneous push-button

5-4-13 BackEnd Connectors

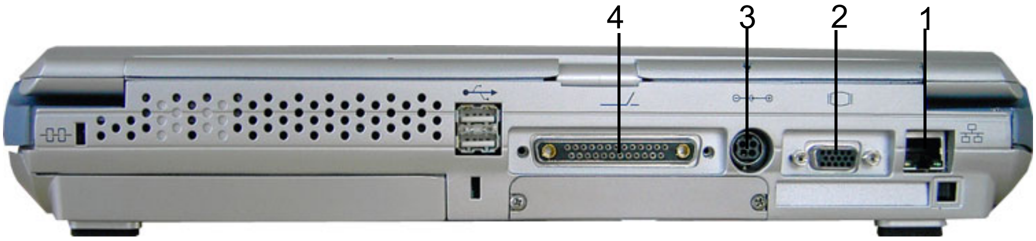


Figure 5-9 View of the Voluson i / Voluson e Rear Panel

5-4-13-1 External BackEnd Connectors

Table 5-4 External BackEnd Connectors

Connector	Description	View
1	LAN 10/100 Base-TX Ethernet network connector	rear connector panel
2	SVGA Output (VCR option or CRT monitor option)	rear connectors panel
3	Port for DC IN (AC Adapter)	rear connectors panel
4	Docking connector	rear connectors panel

5-4-14 15" LCD Monitor

The Voluson i / Voluson e 15" LCD Monitor incorporates improved XGA-LCD technology, has a power consumption of approximately 8W, provides a wide viewing angle, and features enhanced contrast capabilities.

Section 5-5
Power Supply Unit

5-5-1 Introduction

The Power Supply Unit (GPP) provides the Voluson i / Voluson e system with both Low Voltage and High Voltage power, and also enables recharging of the battery.

The GPP Unit controls following main functions:

- Input switching stage – selects between the external DC source or internal battery
- Back End Low Voltage power supply (LVPS)
- Standby power supply
- Front End Low Voltage power supply (LVPS)
- Front End High Voltage power supply (HVPS)
- Battery charger
- PS ON/OFF control
- Micro controller and circuitry (used for monitoring, charger control and auxiliary functions). *The PS communicates with the host CPU via the SMBus.*
- 4D motor power - amplifier

5-5-2 Power Supply Unit Components

As shown in Figure 5-10 below, the Power Supply Unit comprises the following components:

- Rechargeable Battery
- PS Controller and Monitor
- DC Source Selector
- Battery Charger
- High Voltage Power Supply (HVPS)
- Low Voltage Power Supply (LVPS)

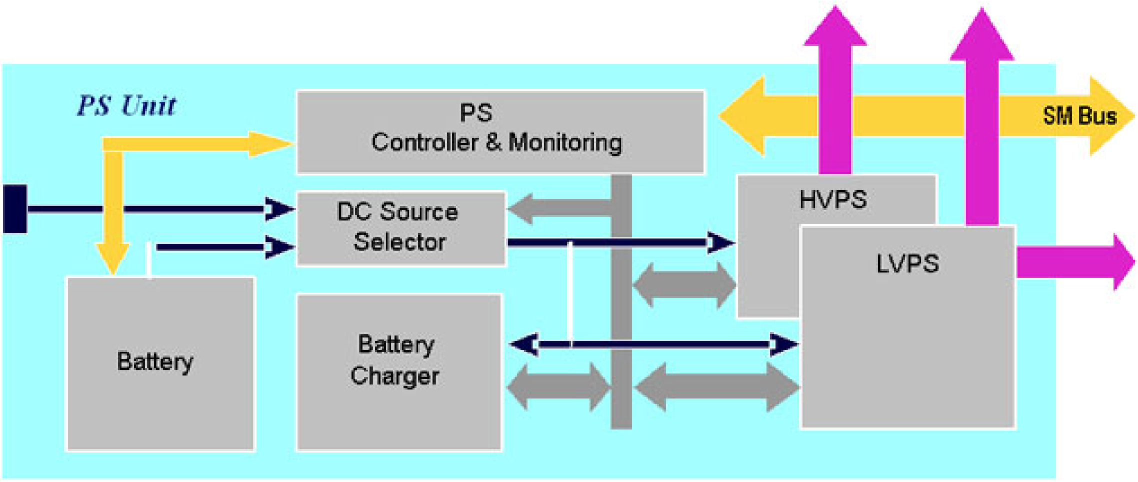


Figure 5-10 Voluson i / Voluson e Power Supply Unit Components - Block Diagram

5-5-3 Power Management

5-5-3-1 Power Operating Modes

The Power Supply unit supports the following operation modes:

Mode	**Description**
Shut Down	• Front End is OFF • BEP is OFF. Only the PMC (Power Manager Controller) is working (powered by 3.3V_STB [less than 2ma]) • In case an external DC is applied, the PS should be powered and the charger should be activated (unless the battery is fully charged) in all modes except *Scanning* to avoid noise introduction during battery charging.
Standby	• The Back End Processor (BEP) is in standby mode.
Scanning	• Both Back End & Front End are ON

5-5-3-2 Critical Temperature Sensor

The PS Unit includes a temperature sensor that will shutdown the DC-DC power supply if a critical temperature is reached inside the PS.
After the temperature settles down the PS will enable the DC -DC operation.

5-5-4 DC Source Selector

This circuitry selects the source of the power. When the AC DC converter input into the system is higher than 18V, the system will be powered by the AC DC converter. Otherwise, the selector will look for an alternative power source (the battery), expecting to receive between 16 and 12V DC.

5-5-5 Rechargeable Battery Pack Assy (GPA)

The lithium ion rechargeable battery provides power to the Voluson i / Voluson e system whenever an AC power source is not available. The system is supplied with a lithium ion rechargeable battery pack (GPA) installed in the battery bay, as standard. It is the 4th feet and provides stable standing.
The Voluson i / Voluson e has built-in charger functionality (see: Section 5-5-6 "Battery Charger" on page 5-33) and switches automatically from battery operation to AC operation and vice versa.

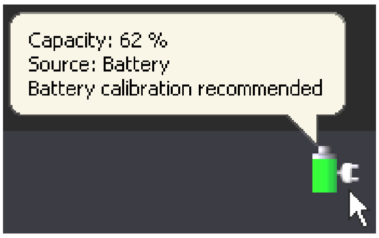
A fully-charged battery should be capable of powering the system for a minimum of 1 hour. (Lithium ion batteries last longer than conventional batteries and therefore do not require replacement as frequently).

When system is running, a status icon is displayed in the status bar to indicate the current battery status.

Table 5-5 Battery Status

Icon	Status Description
🔌	**AC Power is on ; no battery present**
🔋🔌	**AC Power is on; battery is full**
🔋!	**Battery in use; battery almost empty**
🔋	**Battery in use; fully charged**
🔋	**Battery in use; partly charged**
🔋🔌	**AC Power is on; battery is charging**

*NOTE: To check capacity of the battery, move the cursor over the **Battery Icon** in the status area.*



Capacity: 62 %
Source: Battery
Battery calibration recommended

Figure 5-11 Battery Capacity check

When shutting down the system, leave the main power cable connected to keep standby and therefore battery fully charged.

5-5-5 Rechargeable Battery Pack Assy (GPA) (cont'd)

NOTICE The battery is automatically charged when the system is plugged into an active wall outlet.
It takes approximately 10 hours to completely charge a flat battery.

If the system is left in the OFF condition (system unplugged from the wall out let) for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the battery. This could take 15 minutes to as long as 10 hours, depending on battery age, system input voltage and system temperature. To eliminate draining the battery, the system should remain plugged into a wall outlet with wall outlet power switch in ON position.

NOTE: The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such as, watch batteries).

CAUTION **The battery is designed to work with Voluson i / Voluson e systems *only*.**
Only use the batteries authorized by GE.

WARNING ***Used batteries should not be placed with common household waste products. Contact your local authority for the location of a chemical waste collection program nearest to you.***

CAUTION **The battery has a safety device.**

- Do **not** disassemble or alter it. Charge the batteries only when the ambient temperature is between 0° and 65° C (32° and 149° F) and discharge the batteries between -10° and 55° C (14° and 131° F).
- Do **not** short-circuit the battery by directly connecting the battery terminals with metal objects.
- Do **not** heat the battery or discard it in a fire.
- Do **not** expose the battery to temperature over 60° C (140° F).
  Keep it away from fire and other heat sources.
- Do **not** charge the battery near a heat source, e.g. fire or heaters.
- Do **not** leave the battery in direct sunlight.
- Do **not** pierce the battery with a sharp object, hit it, or step on it.
- Do **not** use a damaged battery. Do not solder a battery.
- Do **not** connect the battery to an electrical outlet.

CAUTION **If the Voluson i / Voluson e portable ultrasound system is not being used on a monthly basis, the battery needs to be removed during lengthy non-use period.**

CAUTION **To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:**

- Do **not** immerse the battery in water or allow it to get wet.
- Do **not** put the battery into a microwave oven or pressurized container.
  If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it.
- If you have any questions about the battery, consult GE or your local representative.

Storage of battery pack:

Short term (less than one month): 0° C (32°F) - 50° C (122°F)

Long term (more than three months): 10° C (50° F) - 35° C (95°F).

5-5-6 Battery Charger

5-5-6-1 Introduction

The system is provided with an internal and an optional external battery charger.

The internal Battery Charger is capable of charging the battery pack with up to 0.5C (~3.3A) while keeping the overall dissipated power below a rated power. The charging rate is controlled based on keeping the current capacity of AC adapter.

The Battery Charger is used to charge the lithium-Ion battery pack that is composed of 12 cells of lithium battery arranged in three parallel groups of 4 serially connected cells.

The Battery Charger is in compliance with Level 2 of Smart battery Charger Specification Revision 2.0.

Battery Charger specifications are listed in Table 5-6 below.

Table 5-6 Battery Charger Specifications

Description	Minimum	Nominal	Maximum
Output Voltage	12V	14.4V	16.8V
Charging Current		N/A	0.5C (~3.3A)
Charger Efficiency	93%	95%	96%
Temperature - Charge	0^oC		45^oC
Temperature - Discharge	-20^oC		60^oC
Temperature - Storage	-20^oC		60^oC

Charging Condition:

- Method: Constant Voltage and Constant Current Method
- Voltage: 4.2+/-0.05V /cell
- Current: 0.1A/cell ~ 1.1A/cell (C/5~0.5C)

The PS controller guarantees that under all load and battery conditions the total power consumed by both the charger and the loads is within the maximum rated power of the unit. When the battery is fully loaded the charger is disabled and powered-down to reduce any internal power dissipation.

5-5-6-2 Recalibration

The fuel gauge in the battery uses a highly accurate voltmeter, ammeter and time clock to measure actual charge in and out of the battery pack. In addition, algorithms are built into the smart-battery circuitry to compensate for the effects of discharge rate, discharge temperature, self-discharge and charging efficiency, *etc.*

All these factors combine to provide a highly accurate fuel gauging system. What is also required is the means to ensure the continued reliability of this system throughout the life of the battery pack.

Also, as the battery ages, the amount of available capacity shrinks - like a car with a fuel tank that shrinks as it gets older - so each cycle, the "full" point gets a little bit lower.

After a period of time, if the actual capacity of the battery is below 40% of the designed full capacity, it is recommended to replace the battery. When the condition of the battery reaches this stage it is visibly noticeable that it does not hold its charge for long periods.

Moreover, if the battery is partially charged and discharged during its application, the battery circuitry will not detect the true "full" or "empty" reference point and the fuel gauging system may be subject to drift during use. When the battery detects a drift of >10%, it will set up a flag inside the battery circuitry to warn that it is necessary to recalibrate the battery.

Therefore, the recalibration is used to re-set the fuel gauge algorithms, re-establish the full and empty points, and recalculate the actual capacity in the battery. In this way, even as the battery ages, the accuracy and reliability of the fuel gauge can be retained throughout the life of the battery.

*NOTE: Move the cursor over the **Battery Icon** to check Battery status (see Figure 5-11 on page 5-31).*

NOTE: For procedure instructions, refer to Section 3-6-4-2 "Recalibrating the Battery" on page 3-76.

*NOTE: The most common cause of calibration failure is overheating of the pack during discharge.
For this reason, keep the charger away from direct sunlight or heat sources.*

Section 5-6
Keyboard and Control Panel

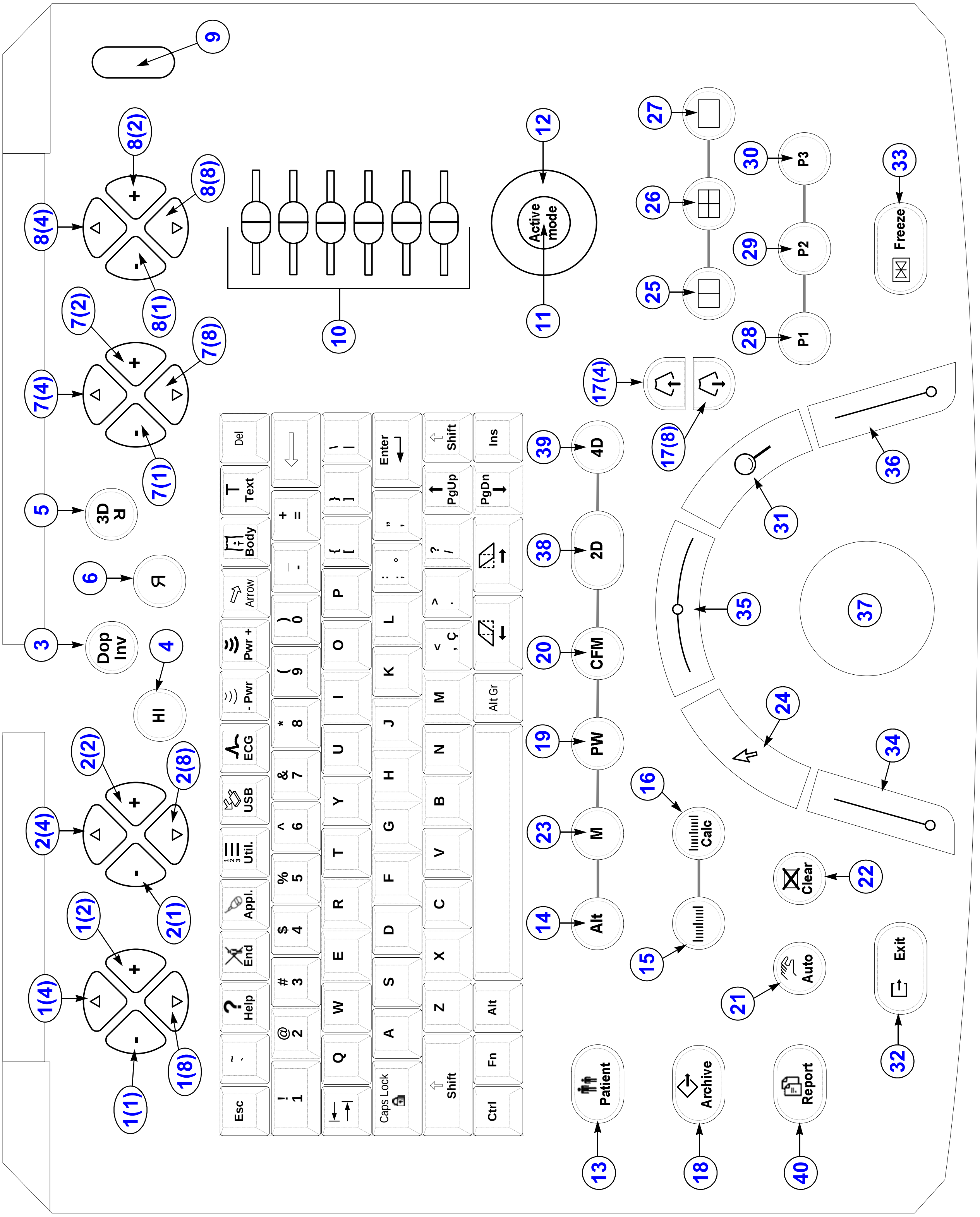

9
8(2)
8(8)
8(4)
8(1)
10
12
11
27
26
25
30
29
28
33
Active mode
P3
P2
P1
Freeze
7(2)
7(4)
7(8)
7(1)
17(4)
17(8)
5
3D
6
3
Dop Inv
4
HI
39
4D
38
2D
20
CFM
19
PW
23
M
14
Alt
36
31
35
37
24
34
16
Calc
15
22
Clear
21
Auto
32
Exit
13
Patient
18
Archive
40
Report
2(2)
2(8)
2(4)
2(1)
1(2)
1(4)
1(8)
1(1)
Del
Text
Body
Arrow
Pwr +
- Pwr
ECG
USB
Util.
Appl.
End
Help
Esc
Enter
Shift
Ins
PgUp
PgDn
Alt Gr
Caps Lock
Ctrl
Fn

Figure 5-12 Voluson i / Voluson e - Control Console

Table 5-7 Voluson i / Voluson e - key codes

key code	Description	Voluson i / Voluson e - Functionality	X	X	X
1(1)	Soft-menu button -	function depends on currently selected mode			
1(4)	Soft-menu button ↑	function depends on currently selected mode			
1(2)	Soft-menu button +	function depends on currently selected mode			
1(8)	Soft-menu button ↓	function depends on currently selected mode			
2(1)	Soft-menu button -	function depends on currently selected mode			
2(4)	Soft-menu button ↑	function depends on currently selected mode			
2(2)	Soft-menu button +	function depends on currently selected mode			
2(8)	Soft-menu button ↓	function depends on currently selected mode			
3	Dop Inv	inverts M-Mode trace or Doppler spectrum display			
4	HI	(Coded) Harmonic Imaging			
5	Image Orientation (up/down)	alternates Image Orientation up/down			
6	Image Orientation (left/right)	alternates Image Orientation left/right			
7(1)	Soft-menu button -	function depends on currently selected mode			
7(4)	Soft-menu button ↑	function depends on currently selected mode			
7(2)	Soft-menu button +	function depends on currently selected mode			
7(8)	Soft-menu button ↓	function depends on currently selected mode			
8(1)	Soft-menu button -	function depends on currently selected mode			
8(4)	Soft-menu button ↑	function depends on currently selected mode			
8(2)	Soft-menu button +	function depends on currently selected mode			
8(8)	Soft-menu button ↓	function depends on currently selected mode			
9	Power/Standby ON/OFF	On/Off switch of the system			
10	Sliders	TGC Slider Control			
11	Active Mode	if mode combinations are used, button switches between mode -gain controls			
12	Gain	rotary control to adjust the sensitivity (brightness) of the entire image			
13	Patient data (PID)	call-up of the patient data entry menu			
14	Alt	no function			
15	Caliper	Generic Measurements			
16	Calc	Calculation (tables)			
17(4)	Depth (up)	Penetration Depth UP			
17(8)	Depth (down)	Penetration Depth DOWN			
18	Archive	Sonoview - Image management			
19	PW-Mode	PW-Mode (Pulsed Wave Doppler)			
20	CFM-Mode(s)	Color Flow Modes (Color or Power Doppler)			
21	Auto (OTO)	Automatic Optimization			
22	Clear	to clear graphics, measurements and annotations on the screen			
23	M-Mode	M-Mode (Motion Mode)			

Table 5-7 Voluson i / Voluson e - key codes

key code	Description	Voluson i / Voluson e - Functionality	X	X	X
24	Trackball pointer	displays a cursor for menu and image operations			
25	Dual Format (V)	Dual-Screen format (vertical distribution)			
26	Quad Format	Quad-Screen format			
27	Single Format	Single-Screen format			
28	P1	programmable key			
29	P2	programmable key			
30	P3	programmable key			
31	Magnifier (Zoom)	Activates/Deactivates Zoom mode			
32	Exit	Exit current menu			
33	Freeze	Read/Write (Freeze/Run)			
34	Trackball button	left trackball key			
35	Trackball button	middle trackball key			
36	Trackball button	right trackball key			
37	Trackball	Trackball (mouse position) positions the cursor			
38	2D-Mode	2D-Mode (B-Mode)			
39	Acquisition Mode 3D/4D	invokes 3D Volume mode or Real Time 4D mode (continuos volume sweep)			
40	Report	call-up of the Patient report page			

5-6-1 Keyboard and Control Panel Layout

Figure 5-13 below illustrates the layout of the Voluson i / Voluson e keyboard and control panel. The buttons and controls are grouped together for ease of use; the different areas of the keyboard and control panel include the following:

- Soft-menu Buttons – part of the Extended Keyboard
- On/Off Switch
- TGC - Slider Controls
- Alpha-numeric Keyboard
- GAIN Rotary Knob
- Extended Keyboard
- Trackball and Trackball buttons

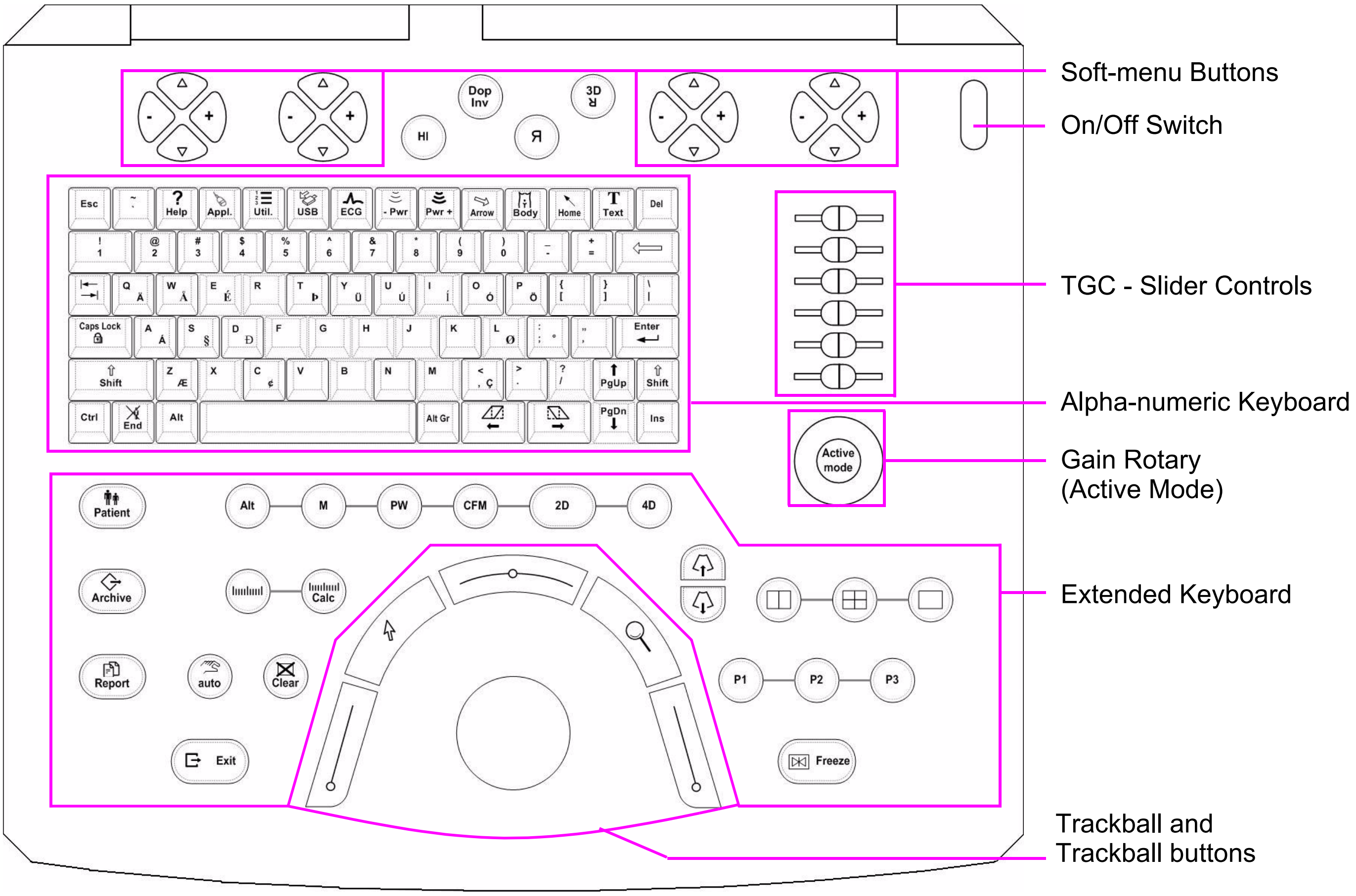

Soft-menu Buttons
On/Off Switch
TGC - Slider Controls
Alpha-numeric Keyboard
Gain Rotary
(Active Mode)
Extended Keyboard
Trackball and
Trackball buttons
Dop Inv
3D
HI
Esc
Help
Appl.
Util.
USB
ECG
- Pwr
Pwr +
Arrow
Body
Home
Text
Del
Caps Lock
Enter
Shift
PgUp
Ctrl
End
Alt
Alt Gr
PgDn
Ins
Active mode
Patient
Alt
M
PW
CFM
2D
4D
Archive
Calc
Report
auto
Clear
Exit
P1
P2
P3
Freeze

Figure 5-13 Voluson i / Voluson e Keyboard and Control Panel Layout

The Voluson i / Voluson e keyboard unit comprises the main user-interactive devices: an alphanumeric keyboard, a 1.5” trackball, and an Extended keyboard. In addition, it includes one or more printed circuit boards (PCBs) designed to carry the various electronic components - these include the keyboards’ controller, TGC potentiometers, USB Hub, and backlight illumination.

5-6-2 Keyboard and Control Panel Components

5-6-2-1 Power ON/OFF Button

The Power On/Off button receives 3.3V from the BEP. Once shorted, this voltage is routed to the PMC which will activate or perform the appropriate task, as required.

5-6-2-2 Lid ON/OFF Switch

The Lid On/Off switch is activated by a magnet located in the LCD frame (on the left side). Once the lid of the system is closed completely, the magnet is positioned above the lid switch which causes the contacts of the switch to short at 3.3V to the PMC. The 3.3V is generated by the BEP.

5-6-2-3 Alphanumeric Keyboard

The Voluson i / Voluson e alphanumeric keyboard, with a key arrangement similar to that of a laptop keyboard.

The alphanumeric keyboard supports all standard alpha-numeric functionality, such as, auto-repeat, standard ASCII output codes, *etc*.

Specially designed, high-quality key caps - together with controllable backlighting - provide a keyboard that is comfortable and easy to use.
The upper row of functional keys (F1 - F11), are assigned to specific ultrasound functions.

5-6-2-4 TGC Sliders

There are six linear Time Gain Compensation (TGC) sliders located to the right of the alphanumeric keyboard (refer to Figure 5-13 on page 5-38). These keys, that slide horizontally, are used to compensate for depth-related attenuation in an image.

5-6-2-5 Gain Rotary (Active Mode button)

The Gain Rotary (located below the TGC Sliders - see Figure 5-13 on page 5-38) has a push button at its center. This is used to toggle between *Active* and *Inactive* mode.

5-6-2-6 Extended Keyboard

The Extended keyboard (see Figure 5-13 on page 5-38) is the ultrasound- specific keyboard which is used to activate the ultrasound system.

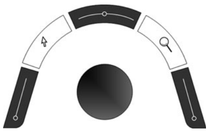
5-6-2-7 Trackball

The Voluson i/e control panel has a 1.5” trackball centrally located to provide easy operation.
The currently activated function of the trackballs is displayed in the status area on the monitor screen.

The trackball supports a variety of basic PC operations and specific ultrasound controls.

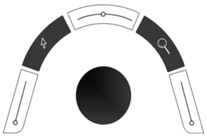
5-6-2-7-1 Trackball Buttons

The 5 buttons surrounding the Trackball can be divided into two groups:



left-, right-, upper Trackball key

These are equivalent to the normal PC mouse.
“mouse click left” = left/right trackball key / “mouse click right” = upper trackball key
The status and the currently activated function of these keys is displayed on the monitor screen.



Menu Pointer [Cursor] and HR-Zoom [Loupe] Button

These buttons, even though located beside the trackball, are part of the External Keyboard, and not part of the Alphanumerical or regular trackball buttons.

5-6-2-8 Key and Backlight Illumination

Keys on the control panel (extended keyboard) are illuminated according to their availability, as follows:

- **Green**- key function is currently *active*.
- **White**- key function is *available* (but not active) in the currently-selected scanning mode and/ or options enabled.
- **No illumination**- key is *not available* in the currently-selected scanning mode and/or options enabled.

5-6-2-9 USB Hub

The USB hub drives the following devices:

- Keyboard controller
- Two general purpose ports
- (current up to 500 mA per port, over-current limit should be used).

Section 5-7
Display Module and LCD Monitor

The Voluson i / Voluson e´s Display Module (GPD) consists of the 15” LCD Monitor in XGA (Extended Graphic Array) technology with built-in backlight lamp, flex connector board to the instrument, backlight inverter board, microphone (not available with SW 8.1.2 and higher),
lid switch magnetic and the mechanical parts.

Section 5-8
Peripherals

5-8-1 Introduction

The following peripherals are used with the Voluson i / Voluson e portable ultrasound system:

- VCR (connected via VGA-to-video converter)
- DVD recorder (connected via VGA-to-video converter)
- Black & White Digital Printer (connected via USB)
- Color Digital Printer (connected via USB)
- Color Deskjet Printer (via Bluetooth Adapter)
- Bluetooth Adapter (connected via USB)
- DVD+R/RW (connected via USB)
- USB Flash Memory device 512MB (connected via USB)
- Wireless Network Adapter (connected via PCMCIA)
- Wireless Network Interface (connected via USB port)
- Footswitch

5-8-1-1 Recording Tools

5-8-1-1-1 VCR and Video Converter

The VCR is controlled from the units front panel. Operation is completely independent of the Voluson i / Voluson e system. One must obtain the appropriate PAL or NTSC VCR in accordance with the regional standards. The VCR is connected to the system via a VGA-to-video converter; the video converter must be set up to fit the regional standards.
For details see Figure 3-72 on page 3-57.

In some regions, the VCR is used as an official patient information back-up device. To obtain the maximum image quality it is recommended to use S-VHS video tapes and make sure that the VCR is setup for *High Quality* recording.

5-8-1-1-2 DVD Recorder and Video Converter

The DVD recorder is controlled from the units front panel. Operation is completely independent of the Voluson i / Voluson e system. The DVD recorder is connected to the system via a VGA-to-video converter; the video converter must be set up to fit the regional standards.
For details see Figure 3-77 on page 3-62.

5-8-1-2 Printers

5-8-1-2-1 Black & White Digital Printer

The B&W Printer receives image data via the USB port. The print command is controlled by the keys **P1**, **P2** or **P3** on the Voluson i / Voluson e control panel (depends on system configuration).

5-8-1-2-2 Color Digital Printer

The Color Printer receives image data via the USB port. The print command is controlled by the keys **P1**, **P2** or **P3** on the Voluson i / Voluson e control panel (depends on system configuration).

5-8-1-2-3 Color Deskjet Printer

Normally, a Color Deskjet Printer is used to print out reports and exams, but in some cases also ultrasound images. It is controlled via Bluetooth Adapter.

5-8-1-3 DVD+(R)W Drive (Writer)

The portable DVD+R/RW Drive (Writer) is used to backup images and reports. In addition, it is used as the main source of software upgrades and other service utility operations. The DVD+R/RW drive can read/write CDs and +DVDs. It is controlled by the BEP via the USB port.

5-8-1-4 Wireless Network Adapter

The Voluson i / Voluson e supports a unique type of Wireless Network Adapter. For details regarding type and installation, refer to Section 3-5-4 "Connecting the Wireless Network Adapter/Interface" on page 3-43.

The Wireless Network Adapter provides a mobile network connection to the local area network.
The Wireless Network Adapter is supported via the PCMCIA port.

5-8-1-5 Wireless Network Interface

The Voluson i / Voluson e supports a unique type of Wireless Network Interface. For details regarding type and installation, refer to Section 3-5-4 "Connecting the Wireless Network Adapter/Interface" on page 3-43.

The Wireless Network Interface provides a mobile network connection to the local area network.
The Wireless Network Interface is supported viathe USB port.

5-8-1-6 Footswitch

The Footswitch is used for comfortable system control when no hand is free.
To adjust function of the Footswitch (Left/Right) see: Section 3-8-1-4 on page 3-100.

Section 5-9
External I/O

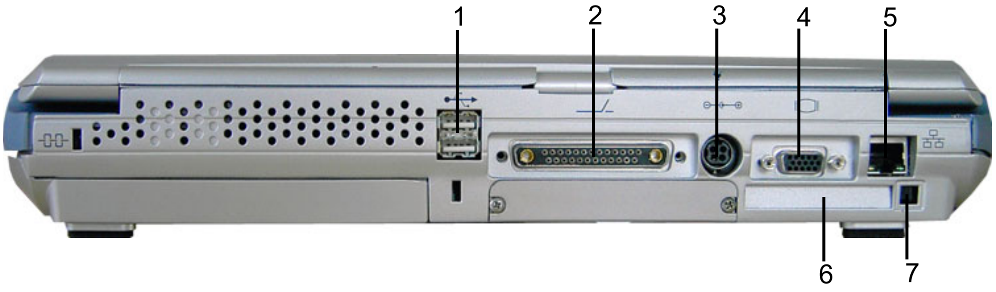


Figure 5-14 View of the Voluson i / Voluson e Rear Panel

1.) Two interchangeable USB ports (Printers, DVD+R/RW Drive and other peripherals)
2.) Docking connector (connector for Voluson Station Docking Adapter)
3.) Port for DC IN (AC Adapter)
4.) SVGA Output (VCR option or CRT monitor option)
5.) LAN 10/100 Base-TX Ethernet network connector
6.) PCMCIA port for PC card (Wireless LAN; only available at GPC1-3)
7.) Ejection lever for PCMCIA device

Section 5-10
Air Flow Control

5-10-1 Air Flow Distribution

The Voluson i / Voluson e cooling system includes five fans which are controlled by the PMC on the ETX baseboard. The fans suck air out of the system through the side vents, removing the warm air from around the internal components of the Voluson i / Voluson e - see Figure 5-15 below.

The structure of Voluson i / Voluson e internal components has been designed to provide the best thermal conduction, allowing the maximum amount of heat to be removed from the system. It is crucial that the system ventilation access is not blocked; a distance of at least 20 cm from right and left of the system should be kept clear. In addition, operating the system in an unclean environment could introduce foreign objects into the unit and create blockage of the airflow, which may eventually cause irreparable damage to the system. There are therefore some minimal environmental conditions that should be provided for optimum operation of the system - for details and recommendations, refer to Table 2-2 on page 2-1.

Periodically, it may be necessary to clean the internal components of the system. This task should be performed by qualified personnel - refer to Chapter 10 - Care & Maintenance on page 10-1 for more details.

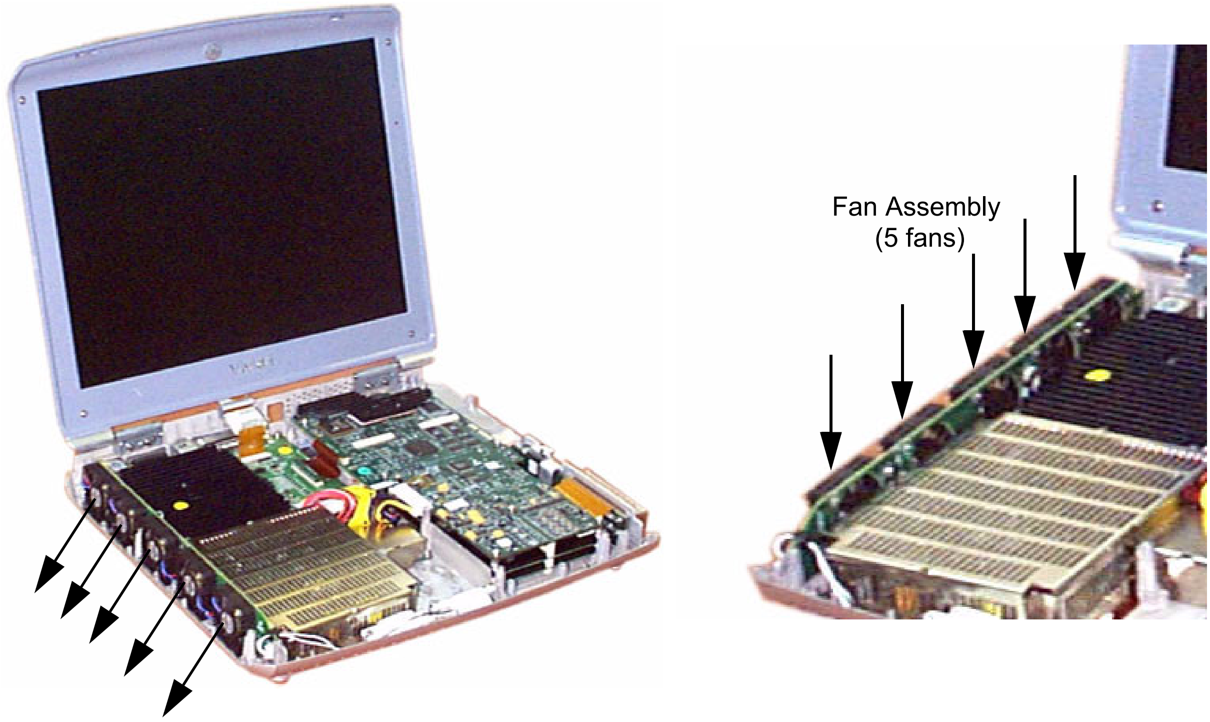


Figure 5-15 Airflow through the Voluson i / Voluson e System

Section 5-11
Service Platform

5-11-1 Introduction

The Service Platform will increase service productivity and reduce training and service costs.

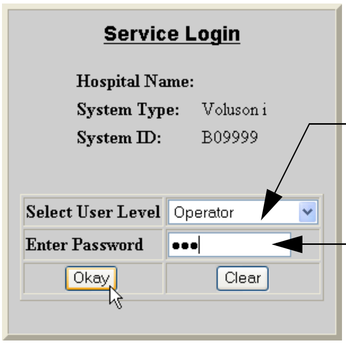
5-11-2 Access / Security

The Service Platform has different access and security user levels.
Each user is only granted access to the tools that are authorized for their use.

- *Local Access*: via System Setup - **SERVICE** page
- *Remote Access*: This offers GE technicians the possibility to view the entire customer´s desktop and operation system. Remote access to the Voluson i / Voluson e scanner requires permission and customer input to run diagnostics.

5-11-2-1 Local Access

1.) If not already in read mode, **FREEZE** the image.
2.) Press the **UTILITIES** key on the keyboard and then select the SYSTEM item from the menu area.
3.) Select the SERVICE page, enter the password SHE and then click the ACCEPT button.
4.) Click the CSD button.
5.) As soon as the GEMS Service Home Page appears, select “Operator” from the pull-down menu, enter the password uls and then click [Okay]


Service Login

Hospital Name:
System Type: Voluson i
System ID: B09999

Select User Level: Operator
Enter Password: •••

select: Operator

enter password: uls

Figure 5-16 Service Login

The Common Service Desktop (CSD) is started and the **[Home]** page - containing basic System Information - appears. The navigation bar at the top of the screen allows to select different tools.

For more detailed information and description refer to Section 5-12 on page 5-47.

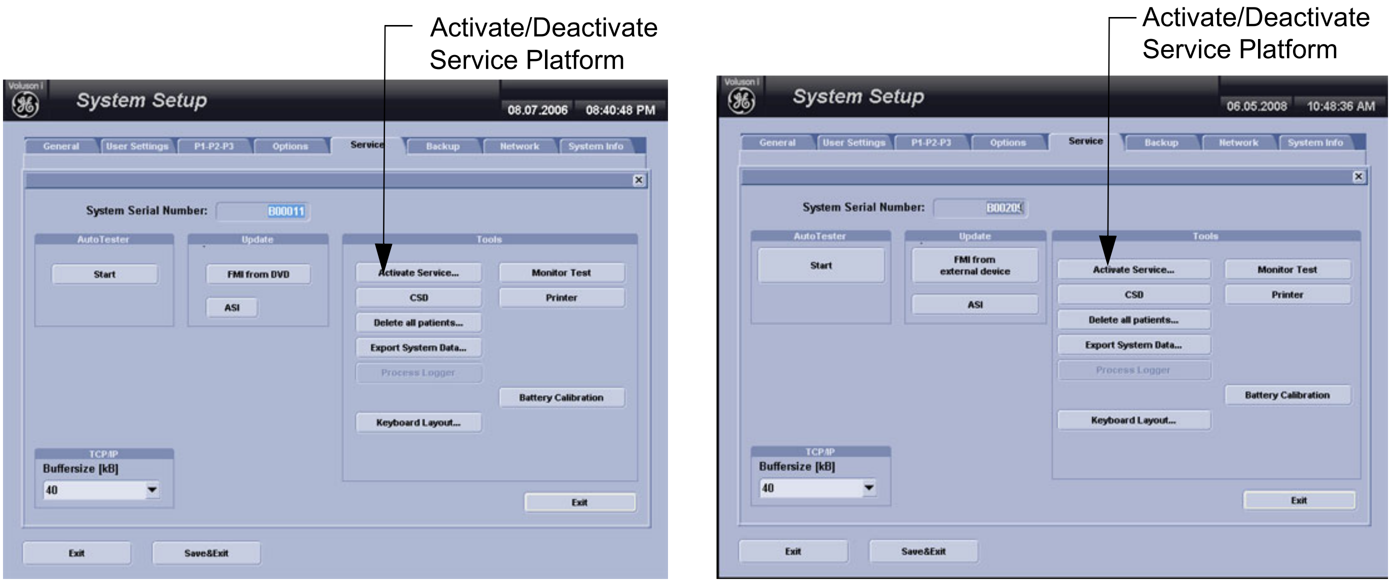
5-11-2-2 Remote Access

This offers GE technicians the possibility to view the entire customer´s desktop and operation system. Remote access to the Voluson i / Voluson e scanner requires permission and customer input to run diagnostics.

NOTE: *Be sure the Voluson i / Voluson e is connected to the Internet and service platform is configured properly.*

If a GE Service technician requests remote access to your Voluson i / Voluson e scanner, activate the service platform as described below.

A.) If not already in read mode, **FREEZE** the image.
B.) Press the **UTILITIES** key on the keyboard and then select the SYSTEM item from the menu area.
C.) Select the SERVICE page, enter the password SHE and click the ACCEPT button.


Activate/Deactivate Service Platform
System Setup
08.07.2006 08:40:48 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
AutoTester
Start
Update
FMI from DVD
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
Exit
Save&Exit
Activate/Deactivate Service Platform
System Setup
06.05.2008 10:48:36 AM
FMI from external device

System Serial Number: B00011
Buffersize [kB] 40

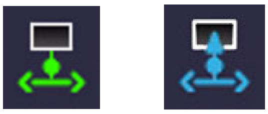
with Software 6.x.x and 7.x.x

with Software 8.x.x

Figure 5-17 Service Tools window

D.) Click on the ACTIVATE SERVICE button. (The button changes to DEACTIVATE SERVICE.)

NOTE: *Visual information about the network status is shown in the status area on the right side of the screen.*



GREEN = DEACTIVATED
Remote Service Access

BLUE = ACTIVATED
Remote Service Access

Figure 5-18 Remote Service Access - Network Status Icon

Section 5-12
Common Service Desktop (CSD)

5-12-1 Internationalization

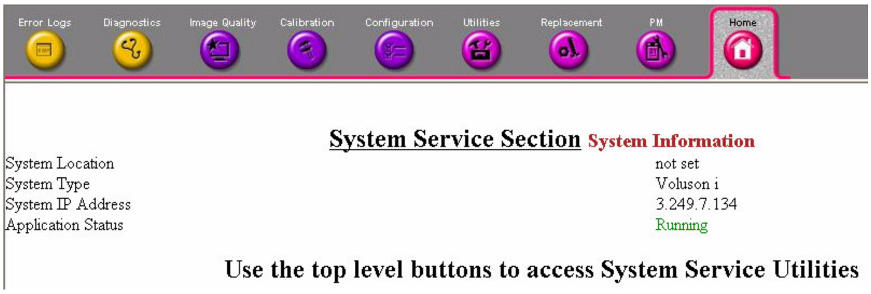
The user interface provided by the service platform is designed for GE personnel and as such is in English only. There is no multi-lingual capability built into the Service Interface.

There are different possibilities to access the Common Service Desktop and its available features:

1.) *Local Access* via System Setup - SERVICE page

2.) *Remote Access* requires customers permission

As soon as the Common Service Desktop (CSD) is started, the Service **[Home]** Page appears



System Service Section System Information

System Location not set
System Type Voluson i
System IP Address 3.249.7.134
Application Status Running

Use the top level buttons to access System Service Utilities

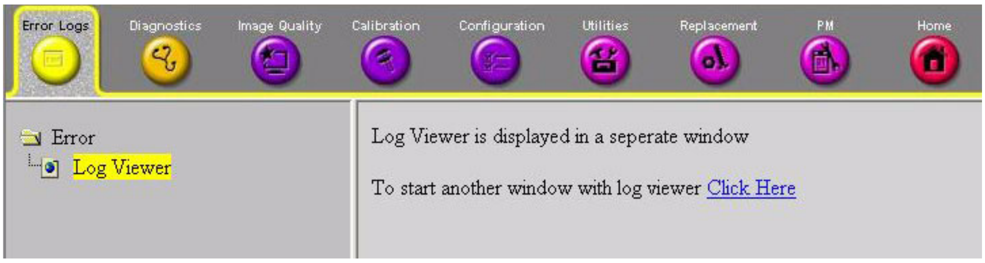
Figure 5-19 Common Service Desktop - Home

The navigation bar at the top of the screen allows to select from following tools:

- Error Logs on page 5-48
- Diagnostics on page 5-48
- Image Quality on page 5-49
- Calibration on page 5-49
- Configuration on page 5-50
- Utilities on page 5-50
- Replacement on page 5-51
- PM on page 5-51

5-12-2 Error Logs

When the **Error Logs** page is selected, different log viewing options are available. Log Viewer is displayed in a seperate window.


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Error
Log Viewer

Log Viewer is displayed in a seperate window

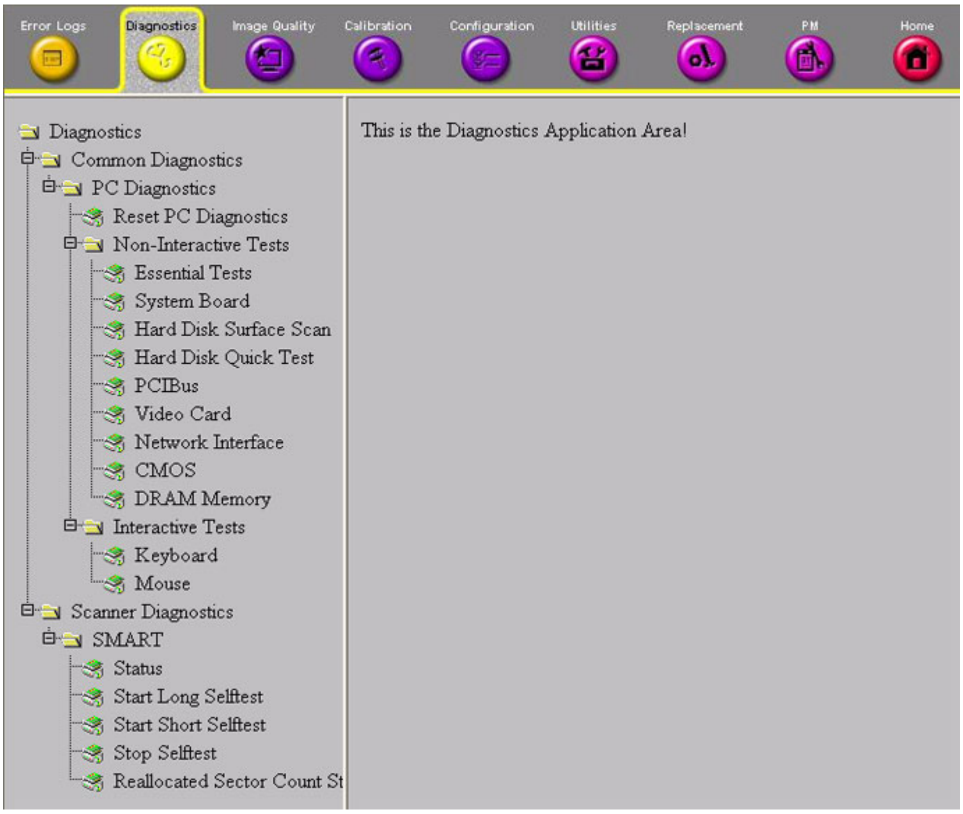
To start another window with log viewer Click Here

Figure 5-20 Common Service Desktop - Error Logs

5-12-3 Diagnostics

The **Diagnostic** page uses a web-controlled user interface to provide access to common service components and perform diagnostics. There are two types of “Common Diagnostics”:

- **Non-Interactive:** The tests are performed without the user’s intervention.
- **Interactive:** The user is required to perform an operation on the ultrasound unit in order for the test to be completed successfully. This option is not applicable when used remotely.

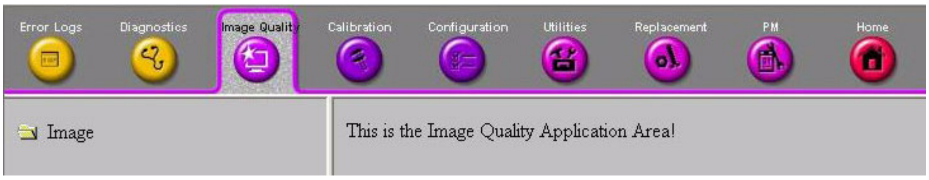

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Diagnostics
Common Diagnostics
PC Diagnostics
Reset PC Diagnostics
Non-Interactive Tests
Essential Tests
System Board
Hard Disk Surface Scan
Hard Disk Quick Test
PCIBus
Video Card
Network Interface
CMOS
DRAM Memory
Interactive Tests
Keyboard
Mouse
Scanner Diagnostics
SMART
Status
Start Long Selftest
Start Short Selftest
Stop Selftest
Reallocated Sector Count St

This is the Diagnostics Application Area!

Figure 5-21 Common Service Desktop - Diagnostics

5-12-4 Image Quality

*NOTE: This **page is not populated** in this version.*

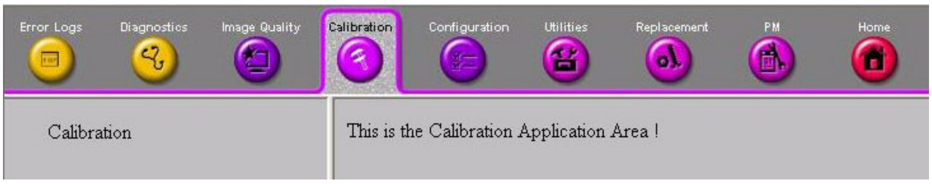

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Image

This is the Image Quality Application Area!

Figure 5-22 Common Service Desktop - Image Quality

5-12-5 Calibration

*NOTE: This **page is not populated** in this version.*

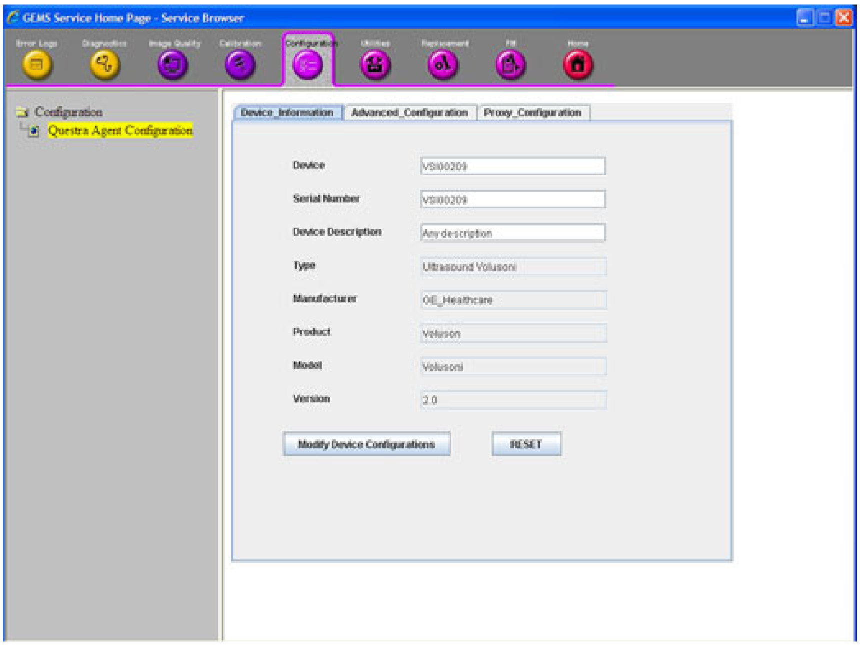

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Calibration

This is the Calibration Application Area !

Figure 5-23 Common Service Desktop - Calibration

5-12-6 Configuration

In the **Configuration** page, you can view and modify different device informations and configurations in the “Questra Agent Configuration” option field.


GEMS Service Home Page - Service Browser
Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Configuration
Questra Agent Configuration
Device_Information
Advanced_Configuration
Proxy_Configuration
Modify Device Configurations
RESET

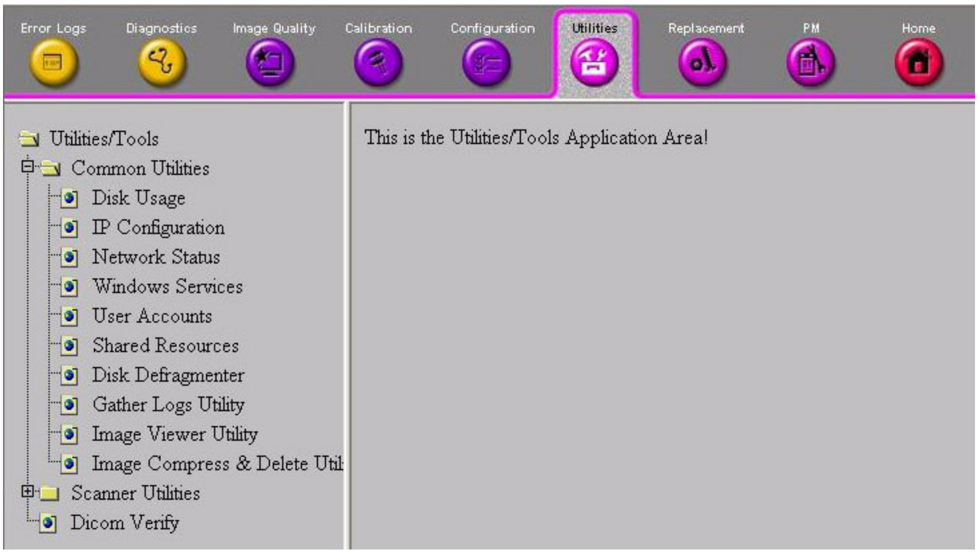
Device: VSI00209
Serial Number: VSI00209
Device Description: Any description
Type: Ultrasound Volusoni
Manufacturer: GE_Healthcare
Product: Voluson
Model: Volusoni
Version: 2.0

Figure 5-24 Common Service Desktop - Configuration

NOTICE Remote access is **ONLY possible if the service platform is properly configured** (either by the user or a GE technican at site). Operation see: Section 7-5-3 "CSD: Configuration" on page 7-13.

5-12-7 Utilities

The **Utilities** page contains a variety of Windows utility tools to indicate the status of the system, in addition to various other tools.

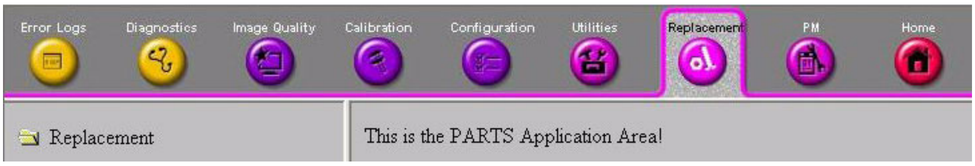

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Utilities/Tools
Common Utilities
Disk Usage
IP Configuration
Network Status
Windows Services
User Accounts
Shared Resources
Disk Defragmenter
Gather Logs Utility
Image Viewer Utility
Image Compress & Delete Util
Scanner Utilities
Dicom Verify

This is the Utilities/Tools Application Area!

Figure 5-25 Common Service Desktop - Utilities

5-12-8 Replacement

*NOTE: This **page is not populated** in this version.*

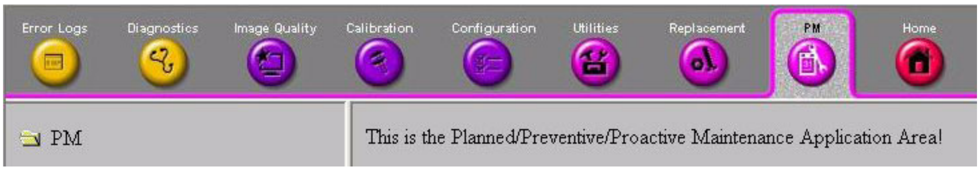

Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Replacement

This is the PARTS Application Area!

Figure 5-26 Common Service Desktop - Replacement

5-12-9 PM

*NOTE: This **page is not populated** in this version.*


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
PM

This is the Planned/Preventive/Proactive Maintenance Application Area!

Figure 5-27 Common Service Desktop - PM

Section 5-13
Service Page

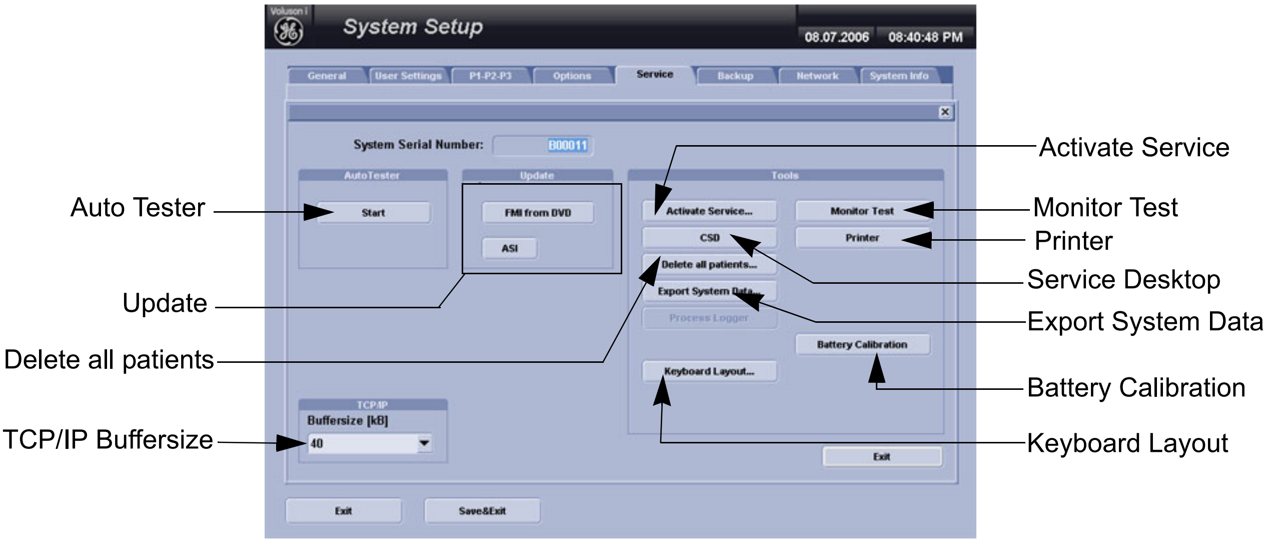
5-13-1 Introduction

The Service Page contains specific software/hardware test modules, system setup, update, etc. for Voluson systems only.

5-13-2 Service Login

NOTICE Extended Access **(for GE field engineers only)** see: Section 5-11-2-1 "Local Access" on page 5-45.

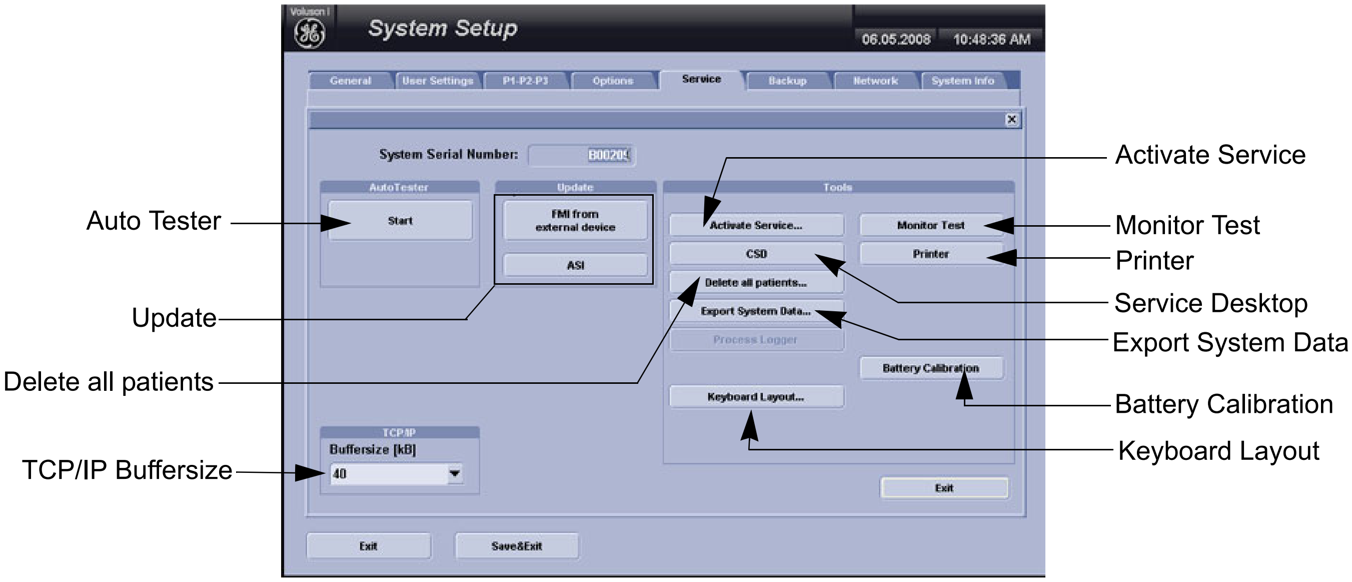
1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
3.) Select the SERVICE page. The “password window” appears automatically.
4.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


Voluson i
System Setup
08.07.2006
08:40:48 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
AutoTester
Start
Update
FMI from DVD
ASI
Tools
Activate Service...
Monitor Test
CSD
Printer
Delete all patients...
Export System Data...
Process Logger
Battery Calibration
Keyboard Layout...
TCP/IP
Exit
Exit
Save&Exit
Activate Service
Auto Tester
Monitor Test
Printer
Service Desktop
Update
Export System Data
Delete all patients
Battery Calibration
TCP/IP Buffersize
Keyboard Layout

System Serial Number: B00011

Buffersize [kB] 40

Figure 5-28 Service Tools window with Software 6.x.x and 7.x.x


Voluson i
System Setup
06.05.2008
10:48:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
AutoTester
Start
Update
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Monitor Test
Printer
Battery Calibration
Keyboard Layout...
TCP/IP
Exit
Exit
Save&Exit
Activate Service
Auto Tester
Monitor Test
Printer
Service Desktop
Update
Export System Data
Delete all patients
Battery Calibration
Keyboard Layout
TCP/IP Buffersize

System Serial Number: B0020

Buffersize [kB]: 40

Figure 5-29   Service Tools window with Software 8.x.x

5-13-2-1 Auto Tester File

Autotest is a log function of customer activities. It records all user actions (scanning, entries, performing Calculations, review of Patient Reports, etc.…). It is possible to safe (record) as file on HDD. But also export to DVD/CD can be done to allow replay of the records on other units.

NOTICE For intermittent problems this file can be requested from the Service Engineer or customer. It is possible to burn this file on DVD/CD+(R)W.

Operation see: Section 7-6 "How to use the Auto Tester program" on page 7-14.

5-13-2-2 Update

5-13-2-2-1 FMI from DVD

By means of the FMI FROM DVD button, the Systems C:\ image is partly or completely updated. The System Software parts to be upgraded depend on contents of the used System DVD.

PRECONDITION: The “Boot priority order” in BIOS has to be **1. IDE 0**, 2. USB CDROM.

*NOTE: During “FMI from DVD” the used system configuration (incl. Full Backup) will be stored on R:\. The previously used System configuration (before FMI from DVD was performed) is simply restored by activating the “**Rollback**” function. Operation see: Section 5-14-1-3 on page 5-58.*

5-13-2-2-2 FMI from external device

By means of the FMI FROM EXTERNAL DEVICE button, the Systems C:\ image is partly or completely updated.
The System Software parts to be upgraded depend on contents of the used System Media (DVD, System Stick).

PRECONDITION: The “Boot priority order” in BIOS has to be **1. IDE 0**, 2. USB HDD.

*NOTE: During “FMI from external device” the used system configuration (incl. Full Backup) will be stored on R:\.The previously used System configuration (before FMI from external device was performed) is simply restored by activating the “**Rollback**” function. Operation see: Section 5-14-1-3 on page 5-58.*

5-13-2-2-3 ASI - Additional Software Installation

Click the ASI button to install additional software (e.g., Process Logger).
The Software parts to be installed depend on the contents of the System Media (DVD, System Stick) that is used.

5-13-2-3 TCP/IP Buffersize

The TCP/IP Buffersize selects the amount of buffer memory used for DICOM® transfers (both directions).

5-13-2-4 Activate / Deactivate Service...

This offers GE technicians the possibility to view the entire customer´s desktop and operation system. Remote access to the Voluson i / Voluson e system requires permission and customer input to run diagnostics.

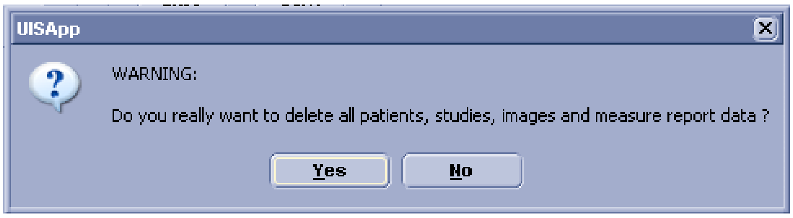
If a GE Service technician requests remote access to your Voluson i / Voluson e scanner, activate the service platform as described in Section 5-11-2-2 on page 5-46.

5-13-2-5 Common Service Desktop (CSD)

Access to the Common Service Desktop (CSD) by entering security user level and password.
Activate the service platform as described in Section 5-11-2 on page 5-45.

5-13-2-6 Delete all Patients

1.) Click the DELETE ALL PATIENTS... button. Following WARNING message appears on the screen.



WARNING:

Do you really want to delete all patients, studies, images and measure report data ?

Figure 5-30 Warning message

WARNING ***If you select the YES button, all patients data, studies, images and measure report data will be deleted permanently from the hard disk and cannot be recovered!***

5-13-2-7 Export System Data

Select the EXPORT SYSTEM DATA button on the “Service Tools” page to Full Backup the System State. This includes dump-files and text files, the full Service Database informations about probes, boards, Software, Options and the Event Log File to the DVD Drive.
Operation see: Section 7-4-2 "Export Log’s and System Data" on page 7-9.

5-13-2-8 Battery Calibration

Select the BATTERY CALIBRATION button to perform fuel gauge recalibration of the battery.
Operation see: 3-6-4-2-1 "Recalibration by means of Internal Battery Charger" on page 3-77.

5-13-2-9 Keyboard Layout

To change the keyboard layout to different languages.
Operation see: Section 6-9 "Modification of Keyboard Layout" on page 6-10.

NOTE: Reconfigure the layout of the keyboard is only useful by changing the concerned keys also. see: Section 8-7 "Replacement of Key Caps (by special native language keys)" on page 8-25.

5-13-2-10 BootUp Screen

With this button you can give in your own name. You can see it, when you Bootup the Voluson i / Voluson e.

5-13-2-11 Monitor Test

Select the MONITOR TEST button to perform color calibration.
Operation see: Section 6-3 "LCD Display (Monitor) Adjustment" on page 6-2.

5-13-2-12 Printer

Installation of printers or editing their settings is possible without entering the Windows Desktop.
Operation see: 3-7-4 "Printer Installation manually" on page 3-87.

WARNING ***Only accessories explicitly recognized and released by the system manufacturer GE may be used in connection with the system.***

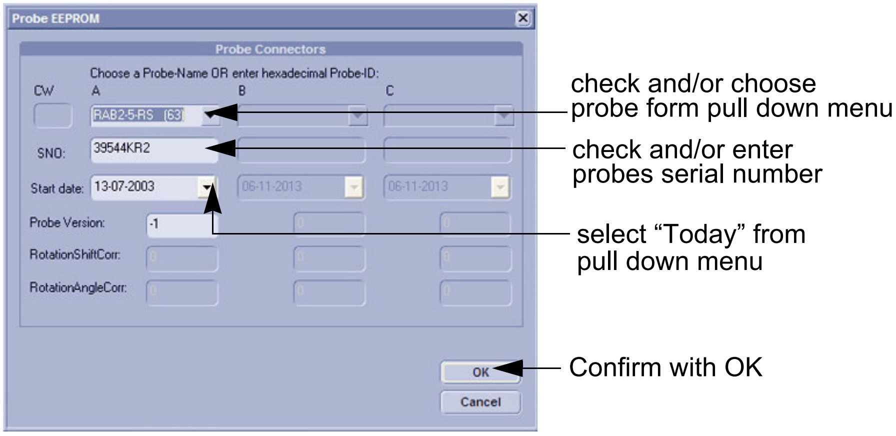
5-13-2-13 Probe EEPROM

NOTE: “Probe EEPROM” is available from software 8.2.2 and software CC200 BT’14 and higher.

NOTICE It is recommended to connect and re-program one probe after the other.

2.) Select the Check and/or choose correct probe name from the pull down menu.

CAUTION **DO NOT assign wrong coding (e.g., programming a RAB to a RIC probe).**
An inaccurate probe programming will mostly likely damage the probe and/or system.



Choose a Probe-Name OR enter hexadecimal Probe-ID:
A: RAB2-5-RS (63)
SNO: 39544KR2
Start date: 13-07-2003 | 06-11-2013 | 06-11-2013
Probe Version: -1 | 0 | 0
RotationShiftCorr: 0 | 0 | 0
RotationAngleCorr: 0 | 0 | 0

check and/or choose probe form pull down menu

check and/or enter probes serial number

select “Today” from pull down menu

Confirm with OK

Figure 5-31 Probe EEPROM screen

3.) Check and/or enter probes Serial Number in the appropriate [SNO] field.

4.) Select “Today” from the Start date pull down menu.

NOTE: ***DO NOT** disconnect the probe during the re-programming process!*

Probe ID and coding is assigned to the probe that is connected to the selected port.

5.) Confirm with

Section 5-14
Boot Screen Functions

5-14-1 Overview

Following LINUX supported functions are available as soon as the “Boot Screen” appears:

Voluson
GE-Service
Rollback
Memtest

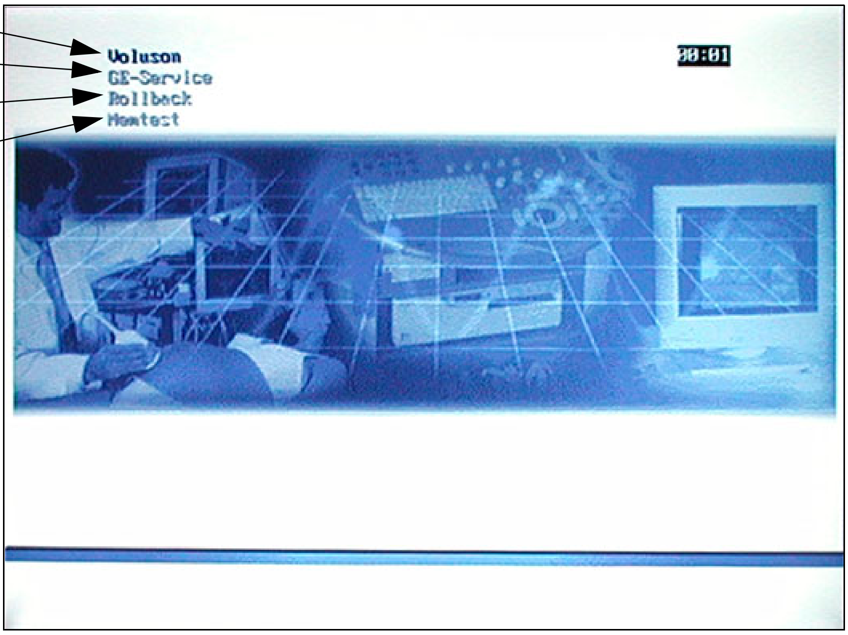


Figure 5-32 Boot screen

NOTICE After 3 sec. without pressing any key, the system will boot-up in windows (= **Voluson** item).
If you missed step 2, retry again with **CTRL** + **ALT** + **DEL**.

5-14-1-1 Voluson

The System will boot-up in windows. The Ultrasound Application is started.
For details refer to Section 3-6-2-1 "During a normal boot, you may observe" on page 3-71.

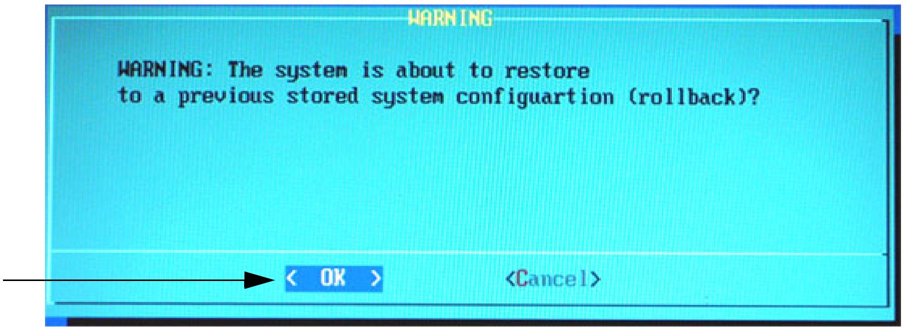
5-14-1-2 GE-Service

This function MUST NOT be used by the customer!

5-14-1-3 Rollback

This function offers the possibility to simply restore the previously used system configuration (rollback), which was stored on R:\ during “FMI from DVD”.

1.) Turn system OFF and then back ON.
2.) As soon as the “Boot Screen” appears (see: Figure 5-32 on page 5-57), press the **PG DN** [↓ Arrow down] key on the keyboard until the **Rollback** item is highlighted, then press **ENTER**.
3.) When the following WARNING message appears, press the ← [Arrow left] button to highlight OK and then press **ENTER**.



WARNING: The system is about to restore to a previous stored system configuartion (rollback)?

select [OK]

Figure 5-33 Warning message

After performing the rollback, the system reboots.
The Ultrasound Application is started and finally the 2D screen is displayed on the monitor.

5-14-1-4 Memtest

Starts the PC Memory Test.
Operation see: Section 5-14-2 "Memory Check in LINUX" on page 5-59.

5-14-2 Memory Check in LINUX

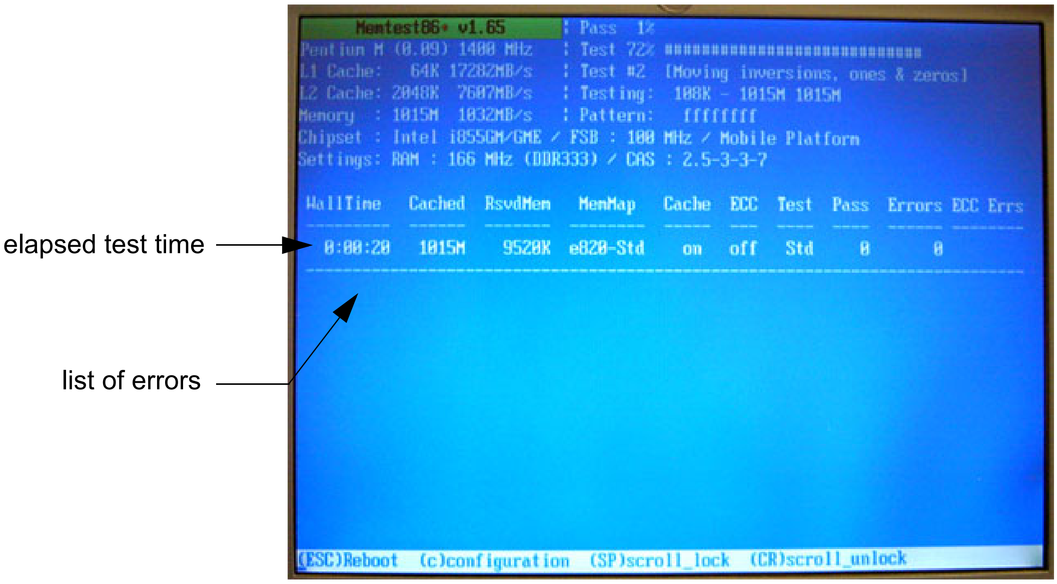
1.) Turn system OFF and then back ON.

2.) As soon as the “Boot Screen” appears (see: Figure 5-32 on page 5-57), press the **PG DN** [↓ Arrow down] key on the keyboard until the **Memtest** item is highlighted, then press **ENTER**.

The PC Memory Test will start automatically and will take about 2.5 hours.

NOTICE After 3 sec. without pressing any key, the system will boot-up in windows.
If you missed step 1, retry again with **CTRL** + **ALT** + **DEL**.

If there are errors they will be listed.



```
     Memtest86+ v1.65          : Pass  1%
Pentium M (0.09) 1400 MHz      : Test 72% ##############################
L1 Cache:   64K 17282MB/s      : Test #2  [Moving inversions, ones & zeros]
L2 Cache: 2048K  7607MB/s      : Testing:  100K - 1015M 1015M
Memory  : 1015M  1032MB/s      : Pattern:   ffffffff
Chipset : Intel i855GM/GME / FSB : 100 MHz / Mobile Platform
Settings: RAM : 166 MHz (DDR333) / CAS : 2.5-3-3-7

 WallTime   Cached  RsvdMem   MemMap   Cache  ECC  Test  Pass  Errors ECC Errs
 ---------  ------  -------  --------  -----  ---  ----  ----  ------ --------
   0:00:20   1015M    9520K  e820-Std     on  off   Std     0       0
 -----------------------------------------------------------------------------

(ESC)Reboot  (c)configuration  (SP)scroll_lock  (CR)scroll_unlock
```

Figure 5-34 Memory check in LINUX

NOTICE After one cycle (~ 2 hours) the memory check starts again. To interrupt the test, press the **ESC** key.
If you don’t interrupt the memory test by pressing the **ESC** key, it will perform never ending cycles of memory checks.

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Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of Chapter 6

This chapter describes how to test and adjust the mechanical capabilities of a scanner that may be out of specification. Although some tests may be optional they should only be performed by qualified personnel.

Table 6-1 Chapter 6 Contents

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6-4	Network Speed Settings	6-5
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6-7	Dock Cart light Height Adjustment	6-8
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6-10	Daylight Saving Time (DST) - New Dates	6-12

Section 6-2
Regulatory

Verify, where applicable, that any regulatory information or tests required by national law are present and accounted for, and any regulatory tests required by national law are performed *and* documented.

Section 6-3
LCD Display (Monitor) Adjustment

6-3-1 Color Calibration

1.) Press the **UTILITIES** key on the keyboard and then select the SYSTEM item.

2.) Select the SERVICE page, enter the password SHE and click the ACCEPT button.

3.) Select the MONITOR TEST button in the “Service Tools” menu.

4.) Confirm the “Monitor Test” message with YES.

The Monitor Test main menu appears on the screen.

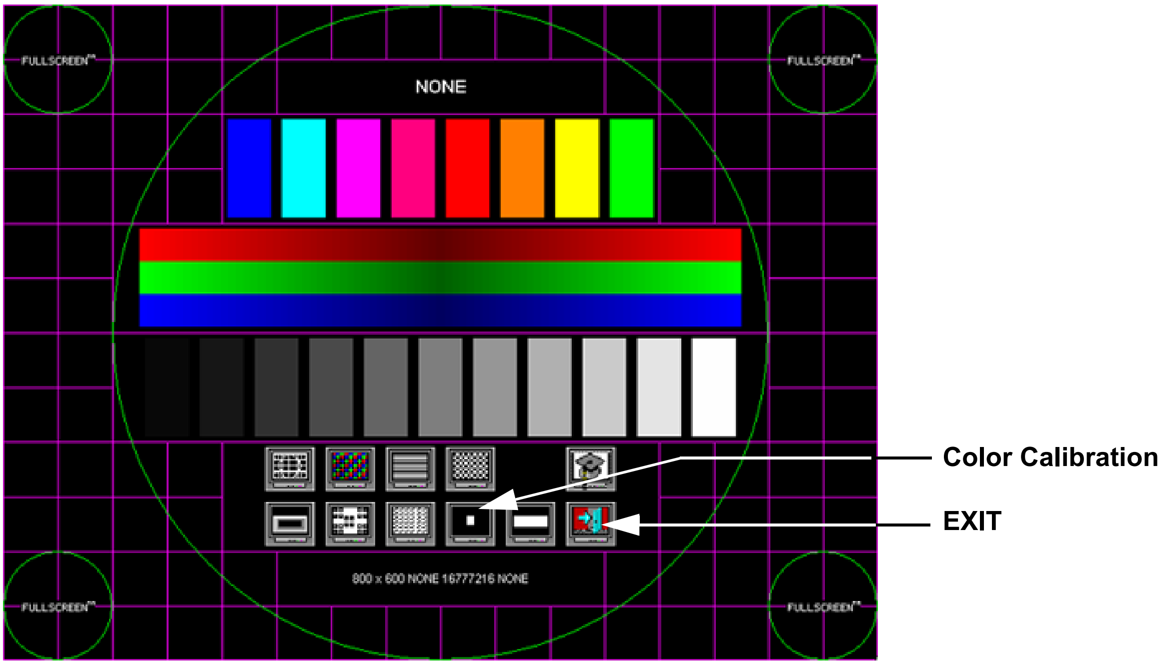

FULLSCREEN
FULLSCREEN
NONE
Color Calibration
EXIT
800 x 600 NONE 16777216 NONE
FULLSCREEN
FULLSCREEN

Figure 6-1 Monitor Test - Main menu

5.) Select the “Color calibration” icon and press the **right/left trackball** (screen becomes white).
  - WHITE is displayed without any tint (discolor) or colored pixels.

6.) Press the **right/left trackball** key repeatedly to step through RED, GREEN and BLUE.
  - Each color is displayed correctly (without any tint or discolored pixels).

7.) To return to the Main menu, press the **upper trackball** key.

8.) To exit the Monitor Test program, press **EXIT**.

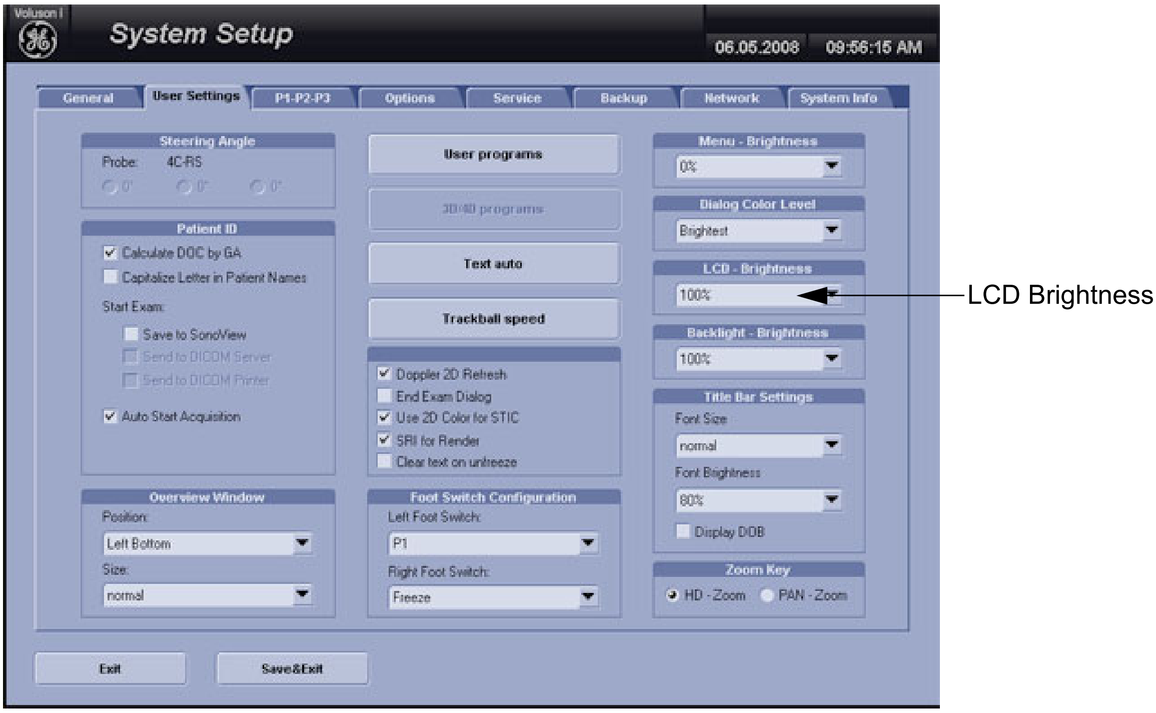
6-3-2 LCD Brightness

Adjusting the LCD brightness is one of the most important factors for proper image quality.
If this is set incorrectly, the Gain, TGC, Dynamic Range and even Acoustic Output may have to be changed more often than necessary to compensate.

The proper setup displays a complete gray scale. The lowest level of black should just disappear into the background and the highest white should be bright, but not saturated.

To adjust the LCD Brightness:

1.) Press the **UTILITIES** key on the keyboard.
2.) In the “Utilities” menu on the left side of the screen select SYSTEM to invoke the setup desktop.
3.) Select the USER SETTINGS page.


Voluson i
System Setup
06.05.2008
09:56:15 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Steering Angle
Patient ID
User programs
3D/4D programs
Text auto
Trackball speed
Menu - Brightness
Dialog Color Level
LCD - Brightness
Backlight - Brightness
Title Bar Settings
Overview Window
Foot Switch Configuration
Zoom Key
Exit
Save&Exit

Probe: 4C-RS
○ 0° ○ 0° ○ 0°

☑ Calculate DOC by GA
☐ Capitalize Letter in Patient Names
Start Exam:
☐ Save to SonoView
☐ Send to DICOM Server
☐ Send to DICOM Printer
☑ Auto Start Acquisition

☑ Doppler 2D Refresh
☐ End Exam Dialog
☑ Use 2D Color for STIC
☑ SRI for Render
☐ Clear text on unfreeze

Menu - Brightness: 0%
Dialog Color Level: Brightest
LCD - Brightness: 100%
Backlight - Brightness: 100%
Font Size: normal
Font Brightness: 80%
☐ Display DOB
● HD - Zoom ○ PAN - Zoom

Position: Left Bottom
Size: normal

Left Foot Switch: P1
Right Foot Switch: Freeze

LCD Brightness

Figure 6-2 System Setup - User Settings

4.) Select the appropriate value from the pop-up menu.
5.) Close the Setup window with the SAVE&EXIT button.

6-3-3 Change Color profil

1.) Press the **UTILITIES** key on the alphanumeric keyboard.

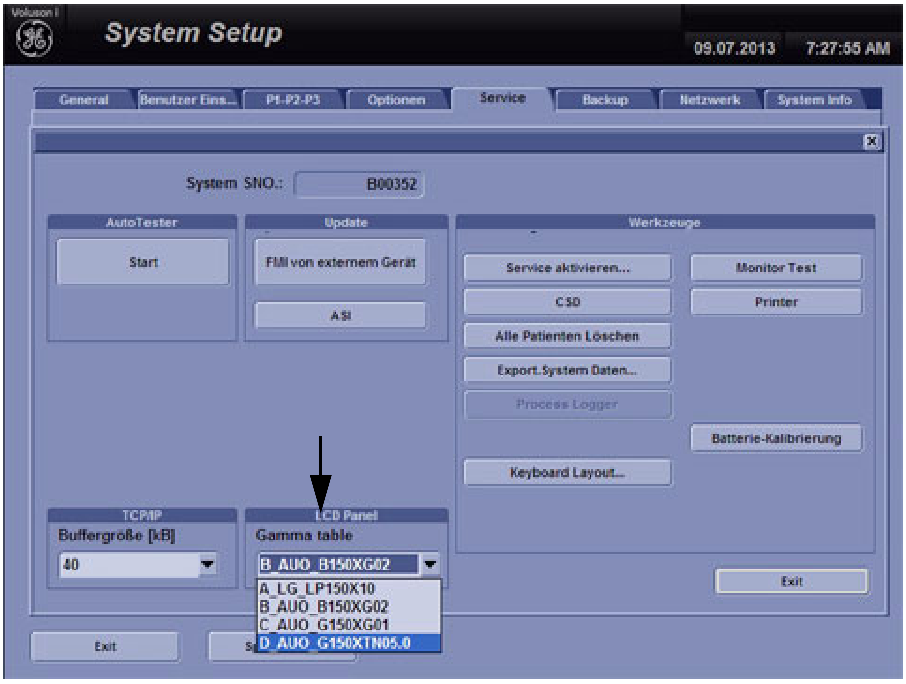
2.) Select the SYSTEM item from the Utilities menu on the left side of the screen.

3.) Select the **SERVICE** page.

4.) Type in the password SHE and click ACCEPT.

5.) In the box "LCD Panel" select appropriated LCD Gamma Table.

NOTE: Select “A_LG” when LCD-Display of GPD1-1a is used.
Select “C_AUO” when LCD15” AUO G150XG01 and GPD5 or GPD6 is used.
Select “D_AUO” when LCD15” AUO G150XTN05.0 and GPD7 is used.



System SNO.: B00352

Buffergröße [kB]: 40

Gamma table: B_AUO_B150XG02

Voluson i
System Setup
09.07.2013
7:27:55 AM
General
Benutzer Eins...
P1-P2-P3
Optionen
Service
Backup
Netzwerk
System Info
AutoTester
Start
Update
FMI von externem Gerät
ASI
Werkzeuge
Service aktivieren...
Monitor Test
CSD
Printer
Alle Patienten Löschen
Export System Daten...
Process Logger
Batterie-Kalibrierung
Keyboard Layout...
TCP/IP
LCD Panel
A_LG_LP150X10
B_AUO_B150XG02
C_AUO_G150XG01
D_AUO_G150XTN05.0
Exit
Exit

Figure 6-3 select correct LCD Panel

6.) Exit System with SAVE&EXIT.

Section 6-4
Network Speed Settings

1.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.
2.) Select SYSTEM and then open the NETWORK page on the System Setup desktop screen.
3.) Click the NETWORK ADAPTER CONFIGURATION button, read the message and confirm with YES.

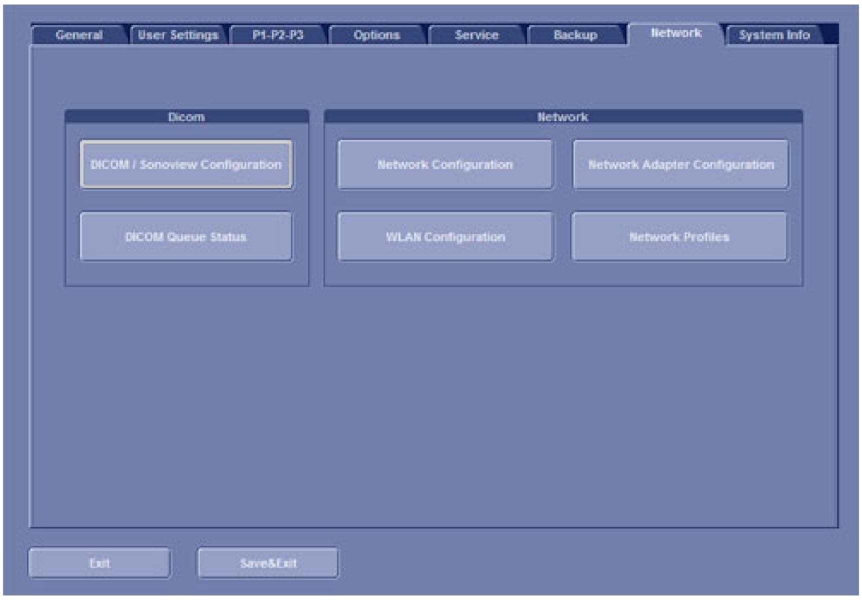
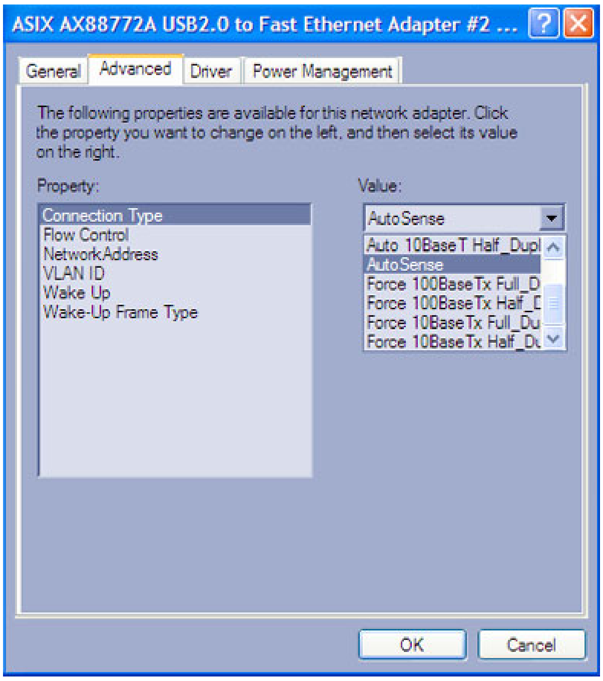

General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Dicom
DICOM / Sonoview Configuration
DICOM Queue Status
Network
Network Configuration
Network Adapter Configuration
WLAN Configuration
Network Profiles
Exit
Save&Exit

Figure 6-4 Network Adapter Configuration

4.) To change the “Network Speed Settings” click on the Tab “Advanced” and select the appropriate Network Speed.


ASIX AX88772A USB2.0 to Fast Ethernet Adapter #2 ...
General
Advanced
Driver
Power Management
OK
Cancel

The following properties are available for this network adapter. Click the property you want to change on the left, and then select its value on the right.

Property:
Connection Type
Flow Control
NetworkAddress
VLAN ID
Wake Up
Wake-Up Frame Type

Value:
AutoSense
Auto 10BaseT Half_Dupl
AutoSense
Force 100BaseTx Full_D
Force 100BaseTx Half_D
Force 10BaseTx Full_Du
Force 10BaseTx Half_Du

Figure 6-5 Network Speed Settings

Section 6-5
Modo Cart Height Adjustment

⚠ **CAUTION** **Only adjust the height of the Modo Cart without the Voluson i / Voluson e and any peripherals mounted.**

NOTE: *A small 4mm hex wrench is needed to loosen the 2 screws on the rear of the Modo Cart.*

1.) Loosen the 2 screws at the rear of the Modo Cart using the 4mm hex wrench.

NOTE: *DO NOT remove this 2 screws!*

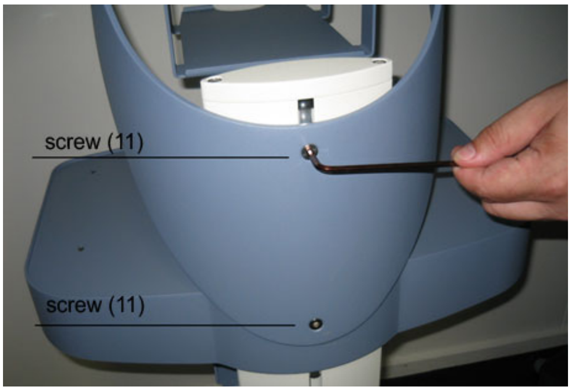
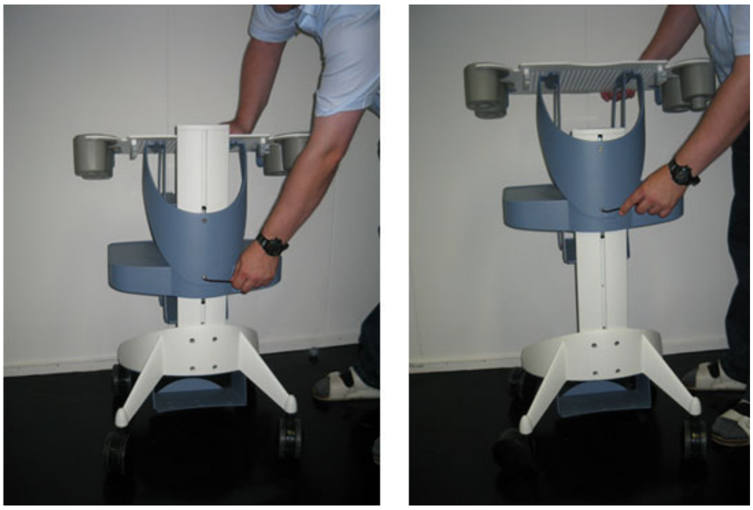


Figure 6-6 loosen 2 screws

2.) Lower respectively raise the shelf assembly until the Modo Cart height is at desired position.

⚠ **NOTICE** When lowering the height of the Modo Cart, be sure to check that the lower storage shelf does not hit any device on the bottom shelf.



lower
shelf assembly

raise
shelf assembly

Figure 6-7 lower/raise the shelf assembly, then fasten screws

3.) Tighten the screws using the 4 mm hex wrench.

NOTE: *You may need to reposition the cable management clips when setting the Modo Cart height to another position.*

Section 6-6
Dock Cart Height Adjustment

CAUTION **Only adjust the height of the Dock Cart without the Voluson i / Voluson e and any peripherals mounted.**

1.) Pull the lever on the left side of the Dock Cart upwards to adjust the height of the Dock Cart. The top shelf will raise automatically.

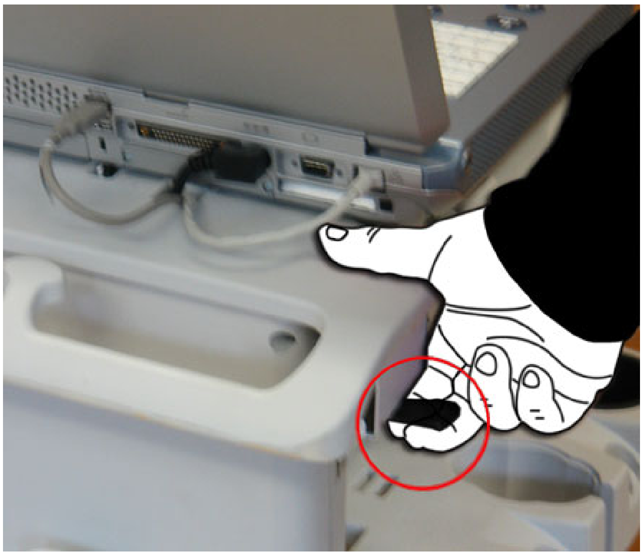


Figure 6-8 Pull the lever on the left side of the cart upwards

2.) To lower the top shelf push the shelf downwards with both hands.

6-6-1 Adjusting height of the middle and lower shelf

NOTE: To adjust the height of a shelf, the shelf must be empty.

NOTE: Make sure to lock the brakes of the Dock Cart.

You need an Allen key, size 5.

1.) Remove the 4 Allen screws - 2 above and 2 below the shelf.
2.) Adjust height.
3.) Screw the 4 Allen screws back in.

Section 6-7
Dock Cart light Height Adjustment

CAUTION **Only adjust the height of the Dock Cart light without the Voluson i / Voluson e and any peripherals mounted.**

CAUTION **Be careful not to squeeze your fingers when adjusting the height of the Dock Cart light.**

1.) Make sure that the power cable is not connected to the Dock Cart light.
2.) Screw off the 4 screws of the Top Rear Cover.

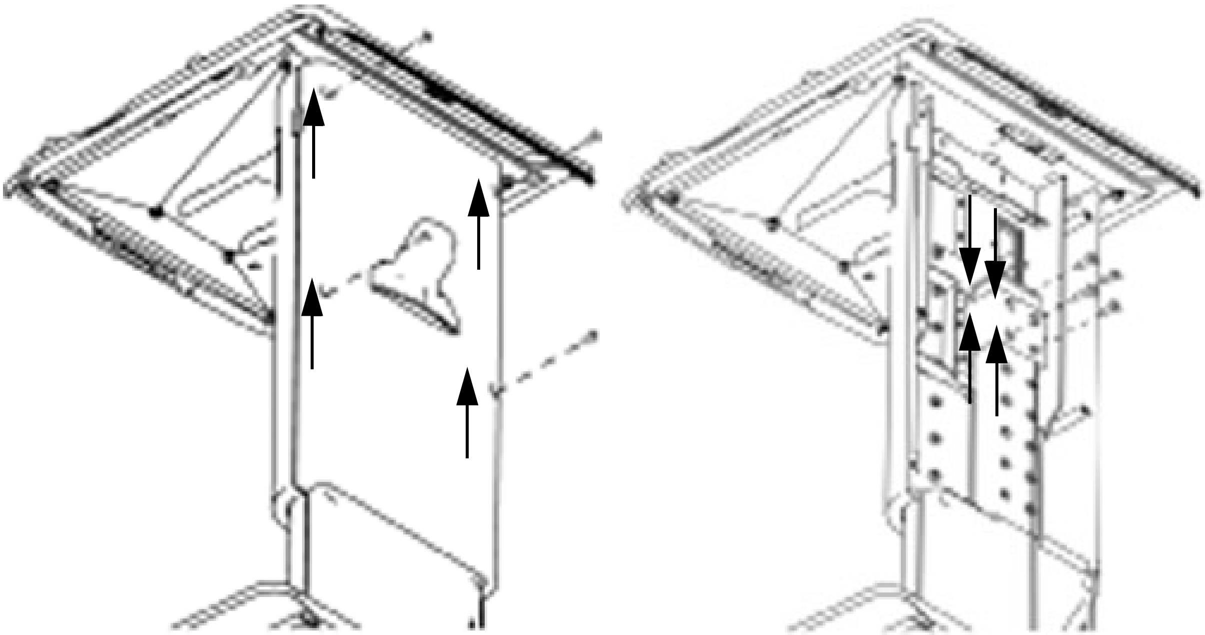


Figure 6-9 remove 4 screws of Top Rear Cover / remove 4 screws

3.) Remove the 4 screws which hold together the Top Frame’s fixation clamp and the Bottom Frame.
4.) Move the Top Frame to the desired position.
5.) Fixate the Top Frame’s position by means of the 4 screws.
6.) Re-apply the Top Rear Cover and fasten with the 4 screws.

6-7-1 Adjusting height of the shelf

NOTE: To adjust the height of a shelf, the shelf must be empty.

NOTE: Make sure to lock the brakes of the Dock Cart light.

You need an Allen key, size 5.

1.) Remove the 4 Allen screws - 2 above and 2 below the shelf.
2.) Adjust height.
3.) Screw the 4 Allen screws back in.

Section 6-8
Voluson Station Height Adjustment

⚠ CAUTION **Only adjust the height of the Voluson Station without the Voluson i / Voluson e and any peripherals mounted.**

⚠ CAUTION **Be careful not to squeeze your fingers when adjusting the height of the Voluson Station.**

1.) Pull the lever on the rear side of the Cart upwards to adjust the height of the Voluson Station. The Top Shelf will raise automatically.

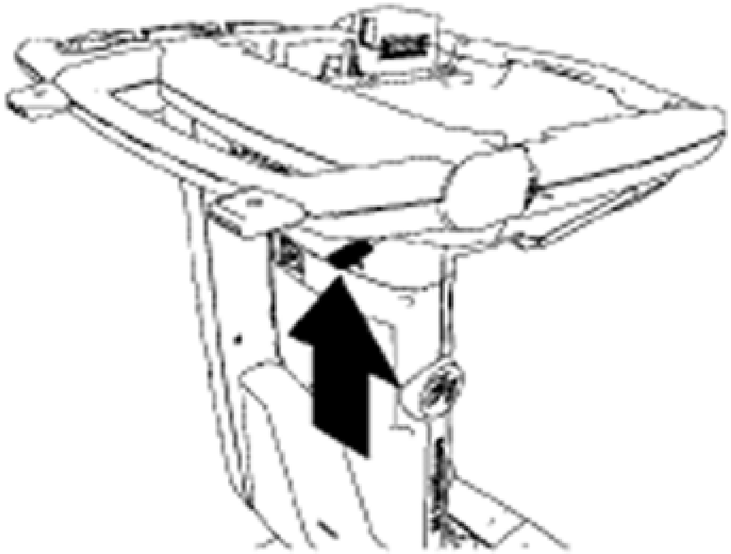


Figure 6-10 Pull the lever on the rear side of the cart upwards

2.) To lower the Top Shelf push the shelf downwards with both hands while pulling lever.

Section 6-9
Modification of Keyboard Layout

NOTE: *Configuring the layout of the keyboard is only useful by changing the concerned keys also. see: Section 8-7 "Replacement of Key Caps (by special native language keys)" on page 8-25.*

6-9-1 Setup the Voluson i / Voluson e Keyboard Language Layout

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the “Utilities” menu.
2.) Select the SYSTEM item from the menu area to activate the setup desktop screen.
3.) Select the SERVICE page. The “password window” appears automatically.

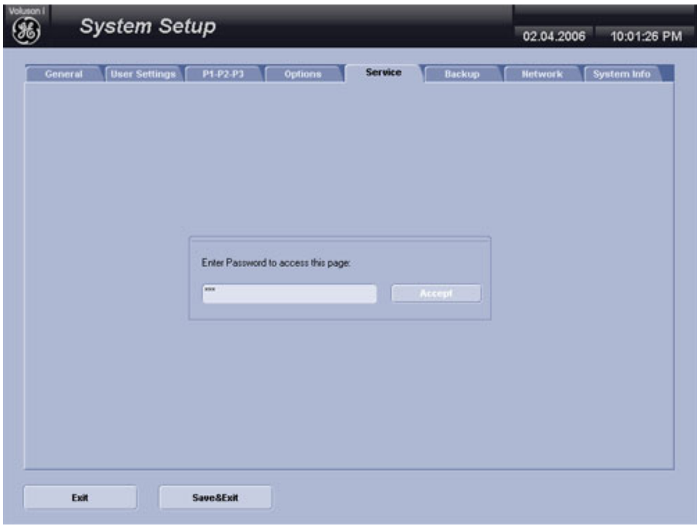
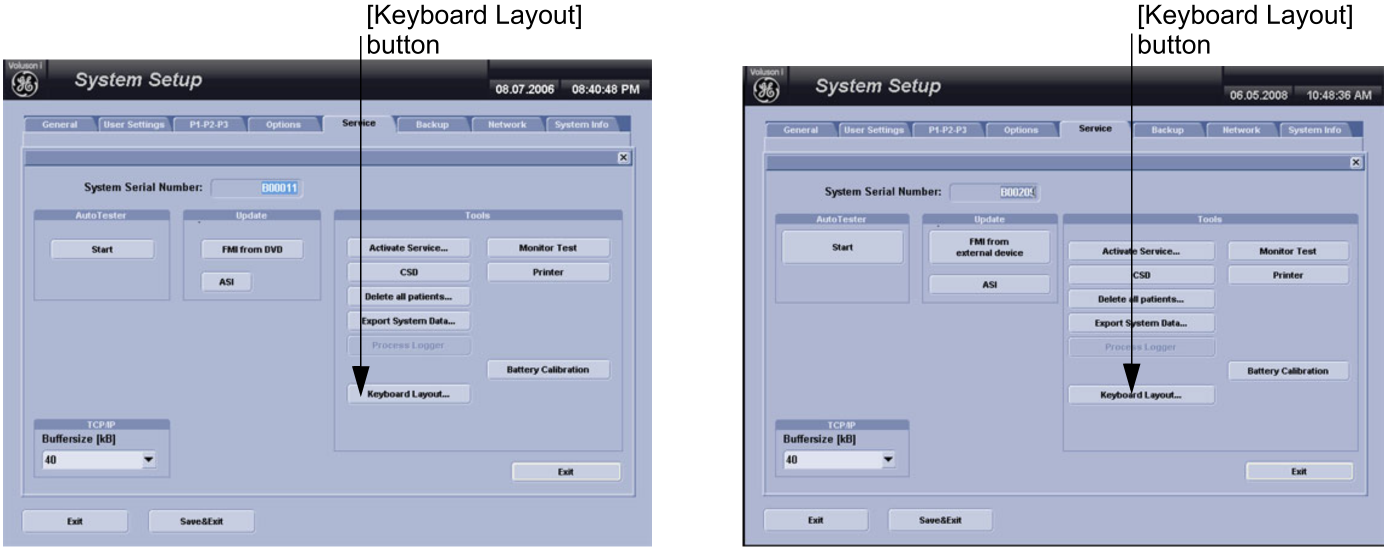

Voluson i
System Setup
02.04.2006
10:01:26 PM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Enter Password to access this page:
***
Accept
Exit
Save&Exit

Figure 6-11 System Setup Service page

4.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


[Keyboard Layout] button
[Keyboard Layout] button
System Setup
08.07.2006
08:40:48 PM
06.05.2008
10:48:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
B00011
B0020
AutoTester
Start
Update
FMI from DVD
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
40
Exit
Save&Exit

with Software 6.x.x and 7.x.x

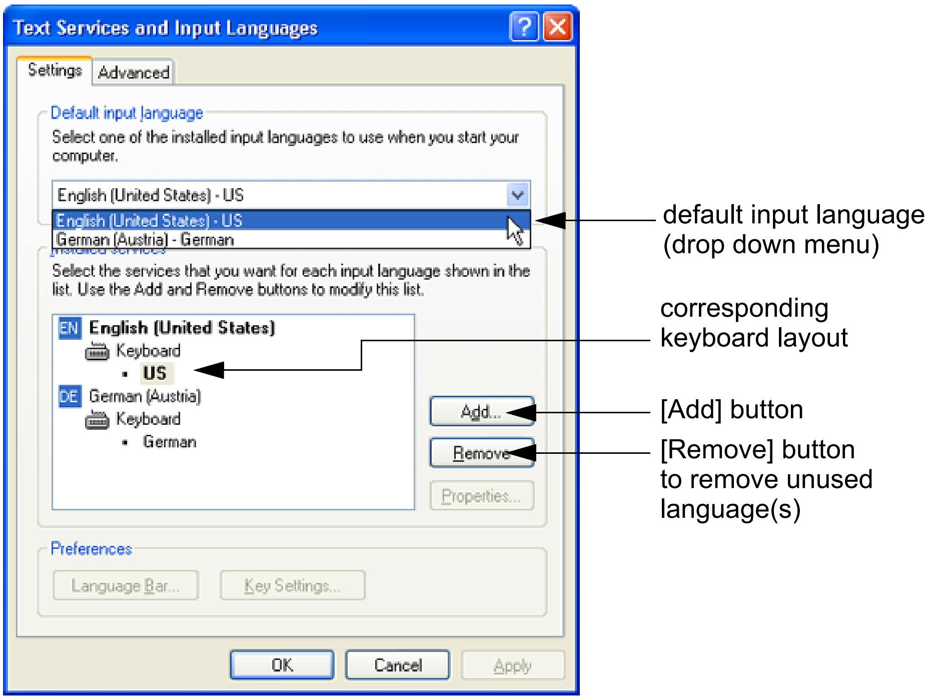
with Software 8.x.x

Figure 6-12 Service Tools window

5.) Click on the KEYBOARD LAYOUT button.

Section 6-9 Modification of Keyboard Layout (cont'd)

6.) Select the default input language from the drop down menu.



Text Services and Input Languages

Settings
Advanced

Default input language

Select one of the installed input languages to use when you start your computer.

English (United States) - US

English (United States) - US
German (Austria) - German
Installed services

Select the services that you want for each input language shown in the list. Use the Add and Remove buttons to modify this list.

EN English (United States)
Keyboard
US
DE German (Austria)
Keyboard
German
Add...
Remove
Properties...
Preferences
Language Bar...
Key Settings...
OK
Cancel
Apply

default input language (drop down menu)

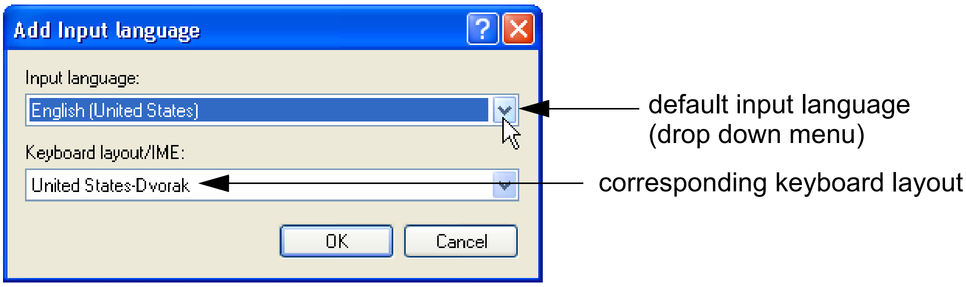
corresponding keyboard layout

[Add] button

[Remove] button to remove unused language(s)

Figure 6-13 Default input language

NOTE: *If the desired language is not listed, click the ADD button, choose the desired input language from the drop down menu, as shown in Figure 6-14 below, and then confirm with OK. (The corresponding keyboard layout is shown automatically.).*



Add Input language

Input language: English (United States)

Keyboard layout/IME: United States-Dvorak

default input language (drop down menu)

corresponding keyboard layout

Figure 6-14 Default Keyboard Settings and Input Locale Properties

7.) If not already done, select the default input language from the drop down menu (see: Figure 6-13). The corresponding keyboard layout is changed automatically.

8.) Click on APPLY and then close the window with OK.

9.) Close the Service page with the SAVE&EXIT button and restart the system.

10.) Reenter "Keyboard Layout" by repeating step 1.) to step 6.). This time remove unused language(s).

11.) Test the Keyboard function after Restart:

- Press the **TEXT** key (upper row of the alphanumeric keyboard).
- Press some keys on the keyboard and verify the entered text.

Section 6-10
Daylight Saving Time (DST) - New Dates

Issue: The automatic Daylight Saving Time feature in Microsoft Windows products may no longer run on the correct date, causing the system's time to be incorrect.

Cause: Some countries have changed their start and end dates for Daylight Saving Time (DST).
Access Microsoft website http://support.microsoft.com/kb/928388 to determine if the system's location site is affected.

Solution: If the Voluson i / Voluson e relies on the automatic DST feature in Microsoft Windows, turn off the feature and then set the correct system time manually at the start of DST and again at the conclusion of DST.

BT Version: The Daylight Saving Time Patch is supplied as standard at BT'07 Software version 7.0.0 (or higher).

Procedure:

1.) Press the **UTILITIES** key on the keyboard. The menu area changes to the Utilities menu.
2.) Select the SYSTEM item to activate the setup desktop screen.
3.) Select the GENERAL page in the System Setup.
4.) Click the DATE/TIME button.
5.) In the displayed "Date/Time Properties" window select the **TIME ZONE** tab.
6.) Uncheck "Automatically adjust clock for daylight saving changes" check box and then click APPLY (see: left image of Figure 6-15 below).

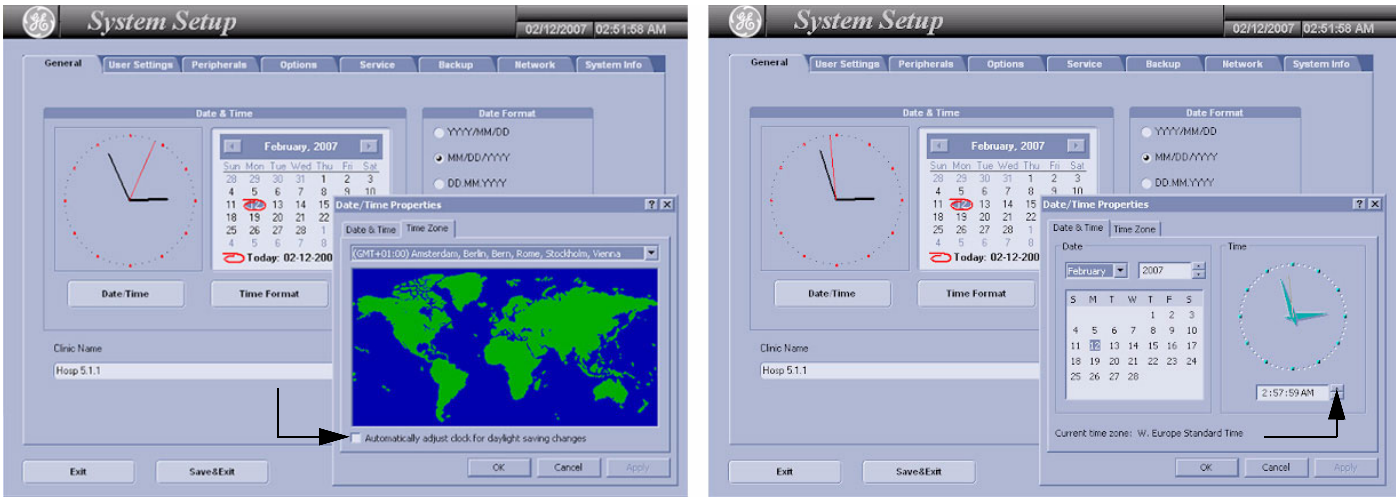

System Setup
02/12/2007 02:51:58 AM
General
User Settings
Peripherals
Options
Service
Backup
Network
System Info
Date & Time
Date Format
February, 2007
YYYY/MM/DD
MM/DD/YYYY
DD.MM.YYYY
Today: 02-12-200
Date/Time
Time Format
Clinic Name
Hosp 5.1.1
Date/Time Properties
Date & Time
Time Zone
(GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
☐ Automatically adjust clock for daylight saving changes
OK
Cancel
Apply
Exit
Save&Exit
Date
Time
February
2007
2:57:59 AM
Current time zone: W. Europe Standard Time

Figure 6-15 Uncheck check box / adjust time

7.) Select the **DATE / TIME** tab in the "Date/Time Properties" window.
8.) Set the proper time for the system's location and then click OK (right image of Figure 6-15, above).
9.) Click the SAVE&EXIT button to save your changes and exit the System Setup page.

The System is shutting down automatically and restarts again.

Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter 7

This section describes how to setup and run the tools and software that help maintain image quality and system operation. Basic host, system, and board level diagnostics are run whenever power is applied. Some Service Tools may be run at the application level.

7-1-2 Overview

There may be a time when it would be advantageous to capture trouble images and system data (logs) for acquisition through remote diagnostics (Insite2) or to be sent back to the manufacturer for analysis. There are different options to acquire this data that would give different results.

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
7-1	Overview	7-1
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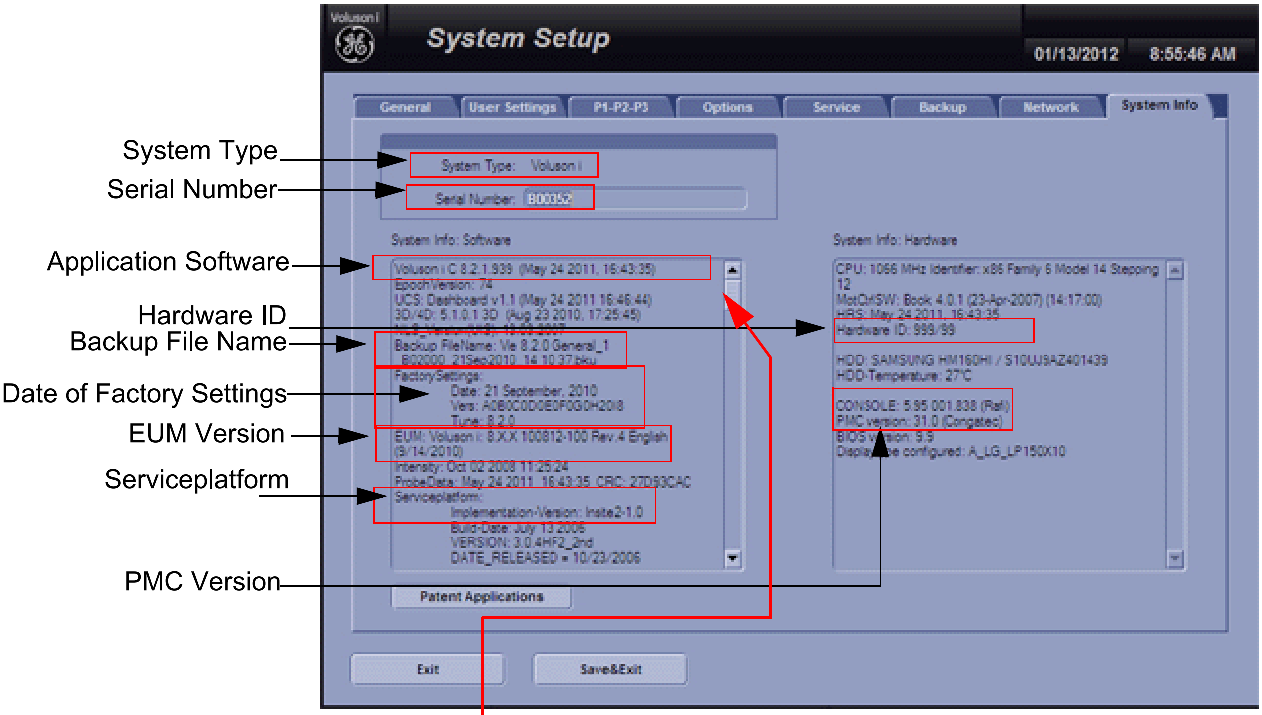
Section 7-2
Collect Vital System Information

The following nformation is necessary in order to properly analyze data or images being reported as a malfunction or being returned to the manufacturer:

Press the **UTILITIES** key, select the SYSTEM item and then enter the SERVICE INFO page.

- **System Type**
- **System Serial number** (also visible on label on the back of the system)
- **Application Software version**
- **Backup Version** (File Name)
- **Additional information** (e.g., Hardware ID, PMC version, etc.)


System Type
Serial Number
Application Software
Hardware ID
Backup File Name
Date of Factory Settings
EUM Version
Serviceplatform
PMC Version
Voluson i
System Setup
01/13/2012
8:55:46 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Patent Applications
Exit
Save&Exit

```
System Type:    Voluson i
Serial Number:  B00352

System Info: Software
Voluson i C 8.2.1.939  (May 24 2011, 16:43:35)
EpochVersion: 74
UCS: Dashboard v1.1 (May 24 2011 16:46:44)
3D/4D: 5.1.0.1 3D  (Aug 23 2010, 17:25:45)
NLS_Version(UIS): 13.03.2007
Backup FileName: Vie 8.2.0 General_1
 _B02000_21Sep2010_14.10.37.bku
FactorySettings:
            Date: 21 September, 2010
            Vers: A0B0C0D0E0F0G0H2018
            Tune: 8.2.0
EUM: Voluson i: 8.X.X 100812-100 Rev.4 English
(9/14/2010)
Intensity: Oct 02 2008 11:25:24
ProbeData: May 24 2011  16:43:35  CRC: 27D53CAC
Serviceplatform:
            Implementation-Version: Insite2-1.0
            Build-Date: July 13 2006
            VERSION: 3.0.4HF2_2nd
            DATE_RELEASED = 10/23/2006

System Info: Hardware
CPU: 1066 MHz Identifier: x86 Family 6 Model 14 Stepping
12
MotCtrlSW: Boot 4.0.1 (23-Apr-2007) (14:17:00)
HRS: May 24 2011, 16:43:35
Hardware ID: 999/99

HDD: SAMSUNG HM160HI / S10UJ9AZ401439
HDD-Temperature: 27°C

CONSOLE: 5.95 001.838 (Rafi)
PMC version: 31.0 (Congatec)
BIOS version: 9.9
Displa[illegible]e configured: A_LG_LP150X10
```

Move the scroll bar downwards to review additional information about installed software/hardware (e.g., Operating System - Service Pack)

Figure 7-1 System Setup - System Info page (e.g., Voluson e)

7-2-1 Needed Data - in case of System crash or Errors

NOTICE In case of a system crash, or errors that are probably software bugs, provide as much detail information as possible before contacting the OLC (**O**n-**L**ine **C**enter).

1.) Contact person (+ telephone number and/or e-mail address)

2.) Vital system data (see: Figure 7-1 on page 7-2)

- System Type
- System Serial number (also visible on label on the back of the system)
- Application Software version
- Backup Version (File Name)
- additional information (e.g., Hardware ID, etc.)

3.) Exact description of fault or error message (dump-file, see: Figure 7-8 on page 7-10)

- Address
- Module + (Address)
- Application Software version
- Memory Dump number (complete #)

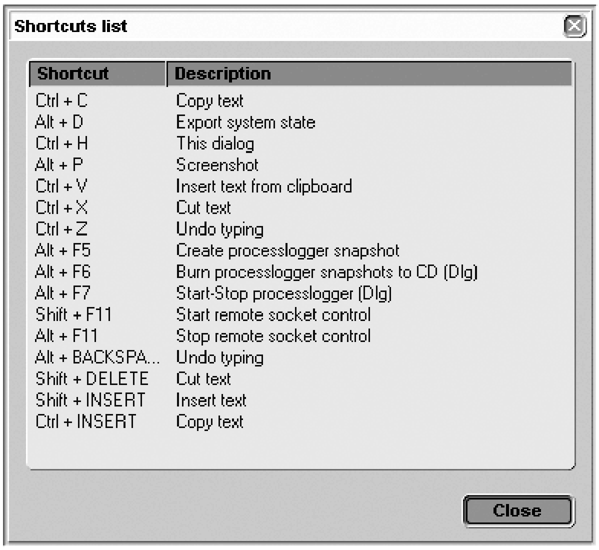
4.) Press the **ALT** + **D** key on the alphanumeric keyboard to save/export

- a screenshot of the point in time when **ALT** + **D** was pressed,
- the current System state (as “Full Backup”) on demand, and
- logs and dump-files already stored on the D:\export folder or on DVD/CD.
  (Operation see: Section 7-4-2-1 on page 7-9)

5.) If the bug or error is difficult to reproduce, record an Auto Tester file (ending at fault occurrence).
(Operation see: Section 7-6 "How to use the Auto Tester program" on page 7-14)

7-2-2 Shortcuts List

NOTE: Press the **CTRL** + **H** key simultaneous to display the shortcuts list and a description of what they do.



Shortcut	Description
Ctrl + C	Copy text
Alt + D	Export system state
Ctrl + H	This dialog
Alt + P	Screenshot
Ctrl + V	Insert text from clipboard
Ctrl + X	Cut text
Ctrl + Z	Undo typing
Alt + F5	Create processlogger snapshot
Alt + F6	Burn processlogger snapshots to CD (Dlg)
Alt + F7	Start-Stop processlogger (Dlg)
Shift + F11	Start remote socket control
Alt + F11	Stop remote socket control
Alt + BACKSPA...	Undo typing
Shift + DELETE	Cut text
Shift + INSERT	Insert text
Ctrl + INSERT	Copy text

Figure 7-2 Shortcut list (Ctrl + H)

For some shortcuts a service dongle and the "Standard GE" revolving password is required. After enabling "Extended Access", press the **LEFT TRACKBALL KEY** *once, followed by the shortcut.*

Shortcut	Description
Ctrl + C	copy text
Alt + D	export system state (Full Backup and Dump files) to D:\export
Ctrl + H	shortcuts list (see: Figure 7-2, above)
H during start	start UISApp in a mode ignoring all Ultrasound hardware
Ctrl + Alt + I	start/stop Presentation Loop
Ctrl + Alt + L	full Backup load
Alt + P	stores screenshot on D:\export
Ctrl + Alt + S	full Backup save
Ctrl + V	paste, insert text from clipboard
Ctrl + X	cut text
Ctrl + Z	undo typing
Ctrl + F8	show password dialog for enabling shortcuts
Alt + F5	create process logger snapshot
Alt + F6	burn process logger snapshot to CD
Alt + F7	start/stop process logger
Shift + F11	start remote socket control
Alt + F11	stop remote socket control
Alt + Backspace	undo typing
Shift + Delete	cut text
Shift + Insert	insert text (paste)
Ctrl + Insert	copy text

Section 7-3
Check Points Voltages

7-3-1 How to check System Status Indicator LEDs

There are two LEDs provided for Indications of Battery and external AC/DC source.

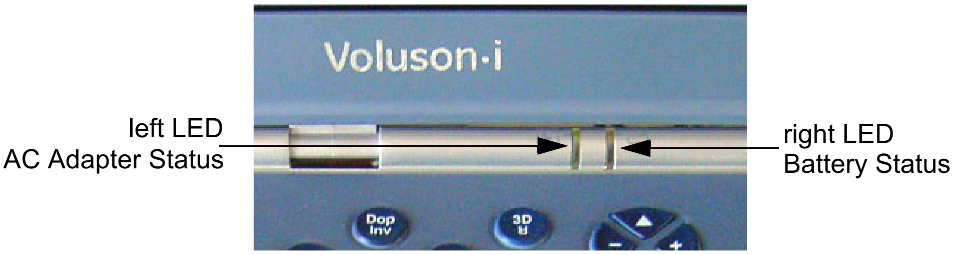


Figure 7-3 Status Indicator LEDs on Voluson i / Voluson e

Table 7-2 left LED - Power Supply (AC Adapter) status

LED Status	System Status	AC Adapter Status
Green	ON	AC/DC power OK
Orange	ON	AC/DC power too low
Off	ON	AC/DC disconnected
Flashing Green	Standby	AC/DC power OK
Flashing Orange	Standby	AC/DC power too low
Off	Standby	AC/DC power disconnected
Green	Full Shutdown	AC/DC power connected
Orange	Full Shutdown	AC/DC power too low
Off	Full Shutdown	AC/DC not connected

Table 7-3 right LED - Battery status

LED Status	System Status	Battery Status
Green	ON	Fully charged
Orange	ON	Low charge
Off	ON	Depleted
Flashing Green	Standby	Fully charged
Flashing Orange	Standby	Low charge
Off	Standby	Depleted
Off	Full Shutdown (No AC)	Any charge
Flashing Green	Full Shutdown (AC connected)	Fully charged
Flashing Orange	Full Shutdown (AC connected)	Low charge

7-3-2 LED diagnose patterns

If an error condition will be recognized by the Power Management Controller SW, it will indicate the error by a special blinking code using the 2 power status leds (see Figure 7-3 on page 7-6).
The normal led indication will be interrupted every 20 seconds for a second of fast blinking, following with 0.5 second of black state and then the appropriate error code pattern,defined Table 7-4 and Table 7-5 below. The pattern will be followed by another 0.5 second of black state, and then the leds will return to the normal indication of the system state. Usually the GPP and GPC are ordered.

Table 7-4 Errors from the power source

AC Adapter LED Status	Battery LED Status		Errors	1st Action	2nd Action
Green	**Green**	once flashing	PWR_OK_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	1. replace GPP 2. replace battery pack
Green	**Green**	twice flashing	STDBY_5V_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	replace GPP
Green	**Green**	three times flashing	BE_PWR_GOOD_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	1. replace GPC 2. replace GPP

Table 7-5 other Errors

AC Adapter LED Status	Battery LED Status		Errors	1st Action	2nd Action
Orange	**Orange**	once flashing	BE_PS_ON_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	replace GPP
Orange	**Orange**	twice flashing	BE_PCI_CLK_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	replace GPC
Orange	**Orange**	three times flashing	FE_PWR_ON_FAILURE	1. disconnect Power Supply cable 2. remove battery pack 3. wait 1 minute 4. reinsert battery pack 5. connect the Power Supply cable 6. restart the system	replace GPP

Section 7-4
Screen Captures and Logs

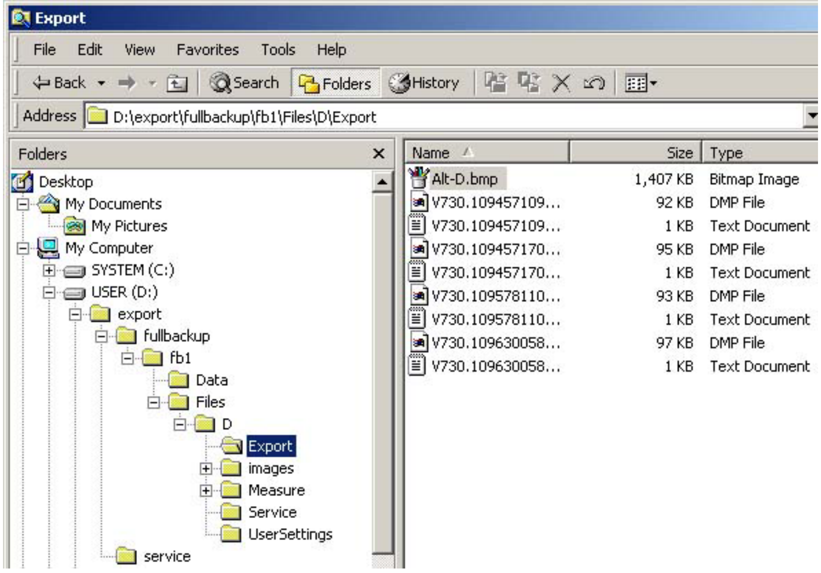
There may be times when the customer or field engineer will want to capture a presentation on the screen so it may be recovered by the **O**n**L**ine **C**enter.

This is accomplished by saving the image(s):

A.) to SonoView and export them (as jpg, bmp or tiff) to DVD/CD+(R)W or external USB-drive.

B.) as jpg and bmp to D:\export by pressing the **ALT** + **P** key on the alphanumeric keyboard.
Note: Successive **ALT** + **P** keystrokes (max. 20) overwrite existing snapshots at destination HDD!

C.) creates one snapshot (Alt-D.bmp) + "Full Backup" of the System state (fullbackup -> fb1) saved on D:\export by pressing the **ALT** + **D** key on the alpha-numeric keyboard.


Export
File Edit View Favorites Tools Help
Back Search Folders History
Folders
Desktop
My Documents
My Pictures
My Computer
SYSTEM (C:)
USER (D:)
export
fullbackup
fb1
Data
Files
D
Export
images
Measure
Service
UserSettings
service

Address D:\export\fullbackup\fb1\Files\D\Export

Name	Size	Type
Alt-D.bmp	1,407 KB	Bitmap Image
V730.109457109...	92 KB	DMP File
V730.109457109...	1 KB	Text Document
V730.109457170...	95 KB	DMP File
V730.109457170...	1 KB	Text Document
V730.109578110...	93 KB	DMP File
V730.109578110...	1 KB	Text Document
V730.109630058...	97 KB	DMP File
V730.109630058...	1 KB	Text Document

Figure 7-4 D:\export

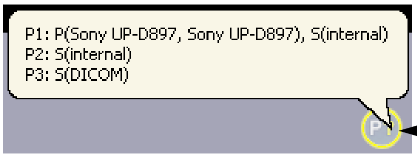
7-4-1 Capturing a screen

The following is the generic process to capture any screen from the scanner.

1.) Navigate to, and display the image/screen to be captured.

2.) Press the **P1**, **P2** or **P3** key (depending on system configuration) on the control panel and save the image to Sonoview.

NOTE: *To find out which key is reserved for saving images to Sonoview, move the cursor over the* ***P?*** *symbol in the status area. This show a short summary of* ***P1****,* ***P2*** *and* ***P3*** *key´s configuration.*



P1: P(Sony UP-D897, Sony UP-D897), S(internal)
P2: S(internal)
P3: S(DICOM)

P? symbol in status area

Figure 7-5 summary of key's configuration

3.) Select the stored image(s) and export them to DVD/CD+R/RW, an external USB drive (optional) or mapped Network drive (jpg, bmp or tiff).

7-4-2 Export Log’s and System Data

There are two possibilities to export system data (and log´s):

1.) by pressing the **ALT** + **D** key to save a snapshot and “Full Backup” of the System state; see: Section 7-4-2-1 on page 7-9

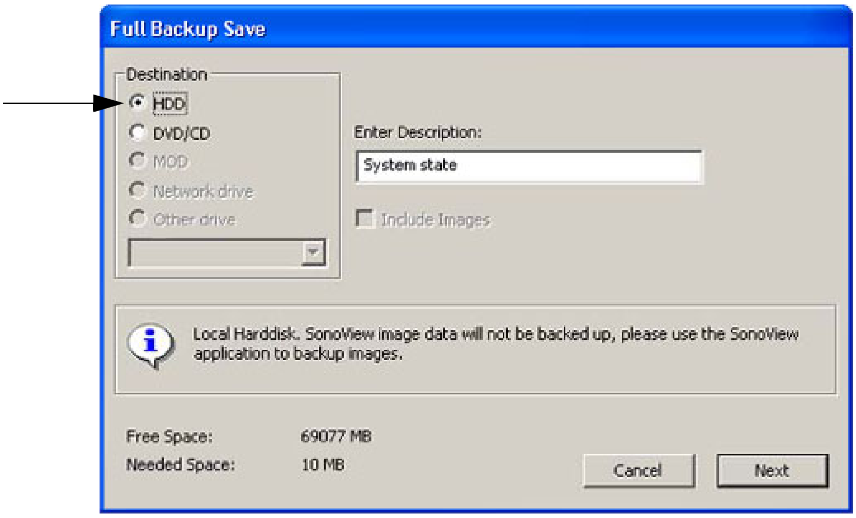
2.) via the EXPORT SYSTEM DATA button in the System Setup **SERVICE** page; see: Section 7-4-2-2 on page 7-10

7-4-2-1 Export System Data (by pressing the ALT + D key)

ALT + **D** uses “Full Backup” to gather data from the system. In addition it creates one screenshot (Alt-D.bmp) of the point in time when **ALT** + **D** was pressed.
The main use is when R&D or OLC need detailed information about the system (e.g., when experiencing strange behaviour or when the problem should be investigated by R&D).
It is **not** intended to replace or enhance the existing Full Backup functionality.

Data can be stored on the hard disk (D:\export\fullbackup\fb1), or you can export them to DVD/CD. Including the D:\export folder, which contains dump files (for details see: Section 7-4-2-2-1), Process Logger files, Autotester files, SMART logs and Screenshots [Alt + P].

1.) Press the **ALT** + **D** key on the keyboard simultaneously.



Enter Description: System state

☐ Include Images

Local Harddisk. SonoView image data will not be backed up, please use the SonoView application to backup images.

Free Space: 69077 MB
Needed Space: 10 MB

Figure 7-6 select destination for “System state” backup

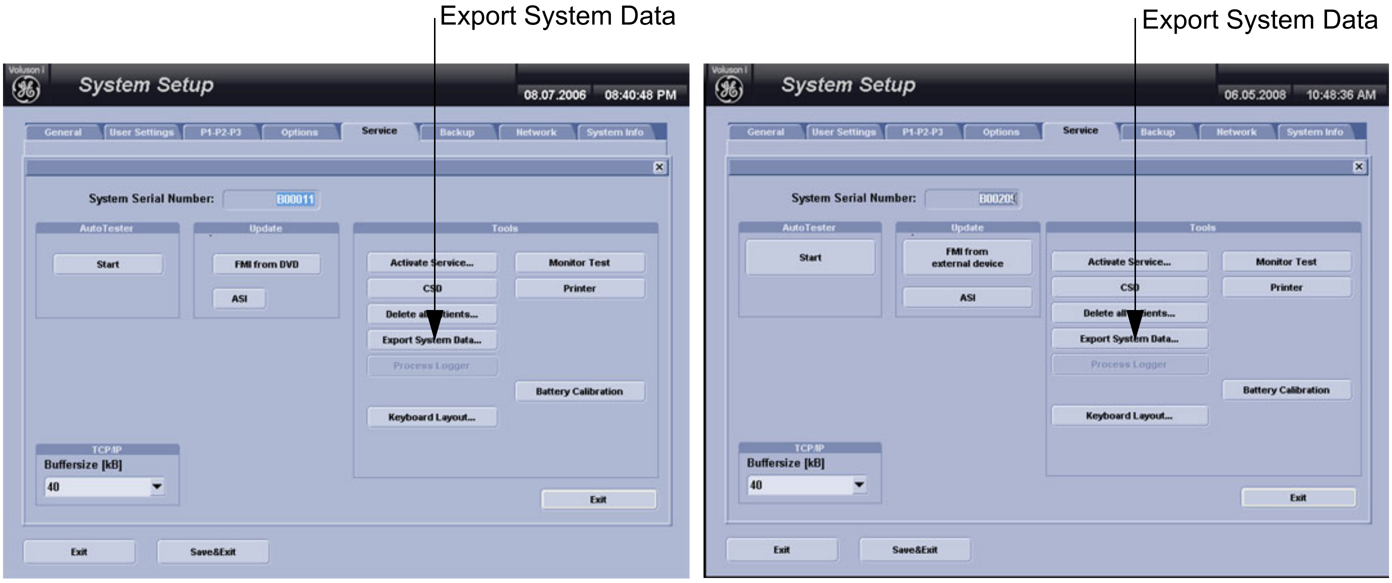
2.) Select the destination of the “System state” backup.

3.) Select the NEXT button to start the backup process.

After saving the data, the Voluson i / Voluson e reboots and the application starts again.

7-4-2-2 Export Log's and System Data (via Service Page)

1.) Press the **UTILITIES** key on the keyboard, select the SYSTEM item from the menu area.
2.) Select the SERVICE page on the screen. The "password window" appears automatically.
3.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


Export System Data
Export System Data
System Setup
08.07.2006 08:40:48 PM
06.05.2008 10:48:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
B00011
AutoTester
Start
Update
FMI from DVD
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all Patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
40
Exit
Save&Exit

with Software 6.x.x and 7.x.x

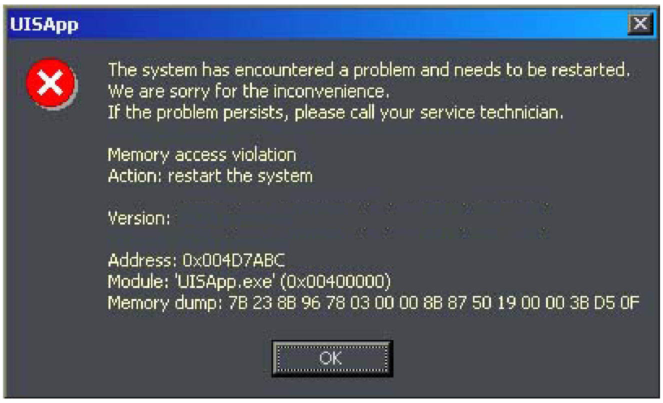
with Software 8.x.x

Figure 7-7 Service Tools window

4.) Click on the EXPORT SYSTEM DATA... button to Full Backup the System State. This includes dump files (see: Section 7-4-2-2-1) and text files, full Service Database informations about probes, boards, Software, Options and the Event Log File to the DVD Drive.

7-4-2-2-1 Dump-file

Every time an error message like Figure 7-8 is produced, a dump-file and a text file containing the error dump and the error message are created in D:\export. Up to 20 dump files are stored there.



The system has encountered a problem and needs to be restarted.
We are sorry for the inconvenience.
If the problem persists, please call your service technician.

Memory access violation
Action: restart the system

Version:

Address: 0x004D7ABC
Module: 'UISApp.exe' (0x00400000)
Memory dump: 7B 23 8B 96 78 03 00 00 8B 87 50 19 00 00 3B D5 0F

Figure 7-8 System has encountered a problem

After clicking on OK the system reboots automatically.

Section 7-5
Remote Access to Service Platform

7-5-1 General

This offers GE technicians the possibility to view the entire customer´s desktop and operation system. Remote access to the Voluson i / Voluson e scanner requires permission and customer input to run diagnostics.

7-5-2 Preparations

NOTE: *Be sure the Voluson i / Voluson e is connected to the Internet and service platform is configured properly in the Common Service Desktop - Configuration page.*

If a GE Service technician requests remote access to your Voluson i / Voluson e scanner, activate the service platform as described in Section 5-11-2-2 "Remote Access" on page 5-46.

A screen with additional system data and information appears.

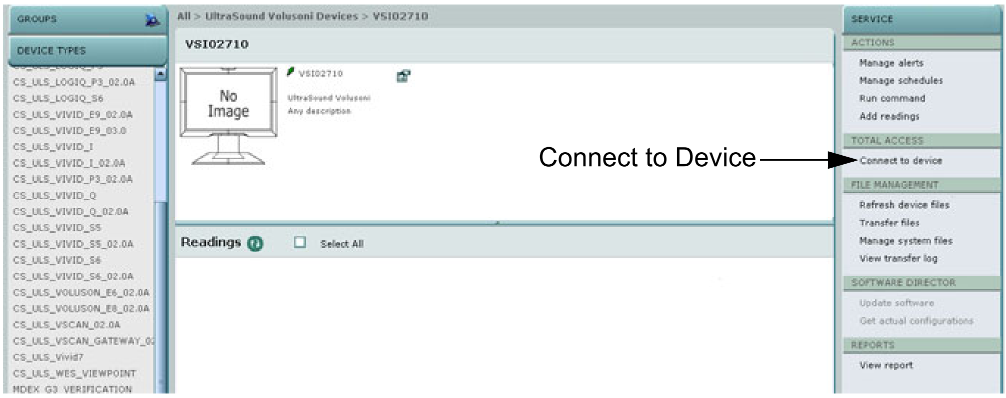
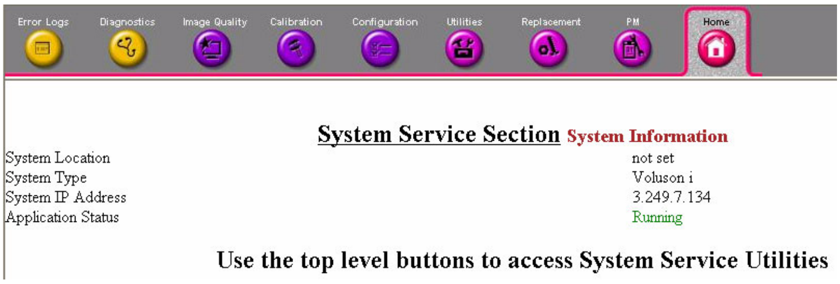

GROUPS
DEVICE TYPES
CS_ULS_LOGIQ_P3_02.0A
CS_ULS_LOGIQ_S6
CS_ULS_VIVID_E9_02.0A
CS_ULS_VIVID_E9_03.0
CS_ULS_VIVID_I
CS_ULS_VIVID_I_02.0A
CS_ULS_VIVID_P3_02.0A
CS_ULS_VIVID_Q
CS_ULS_VIVID_Q_02.0A
CS_ULS_VIVID_S5
CS_ULS_VIVID_S5_02.0A
CS_ULS_VIVID_S6
CS_ULS_VIVID_S6_02.0A
CS_ULS_VOLUSON_E6_02.0A
CS_ULS_VOLUSON_E8_02.0A
CS_ULS_VSCAN_02.0A
CS_ULS_VSCAN_GATEWAY_02
CS_ULS_Vivid7
CS_ULS_WES_VIEWPOINT
MDEX G3 VERIFICATION
All > UltraSound Volusoni Devices > VSI02710
VSI02710
No Image
VSI02710
UltraSound Volusoni
Any description
Connect to Device
Readings
☐ Select All
SERVICE
ACTIONS
Manage alerts
Manage schedules
Run command
Add readings
TOTAL ACCESS
Connect to device
FILE MANAGEMENT
Refresh device files
Transfer files
Manage system files
View transfer log
SOFTWARE DIRECTOR
Update software
Get actual configurations
REPORTS
View report

Figure 7-9 Connect to Device

NOTE: As soon as the Common Service Desktop (CSD) is started, the Service **[Home]** Page appears. *As described in Chapter 5 - Common Service Desktop (CSD) on page 5-47, the service platform uses a web-based user interface (UI) to provide access to common service components. The Service platform is designed for GE personnel and as such is in English only. There is no multi-lingual capability built into the Service Interface.*


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home

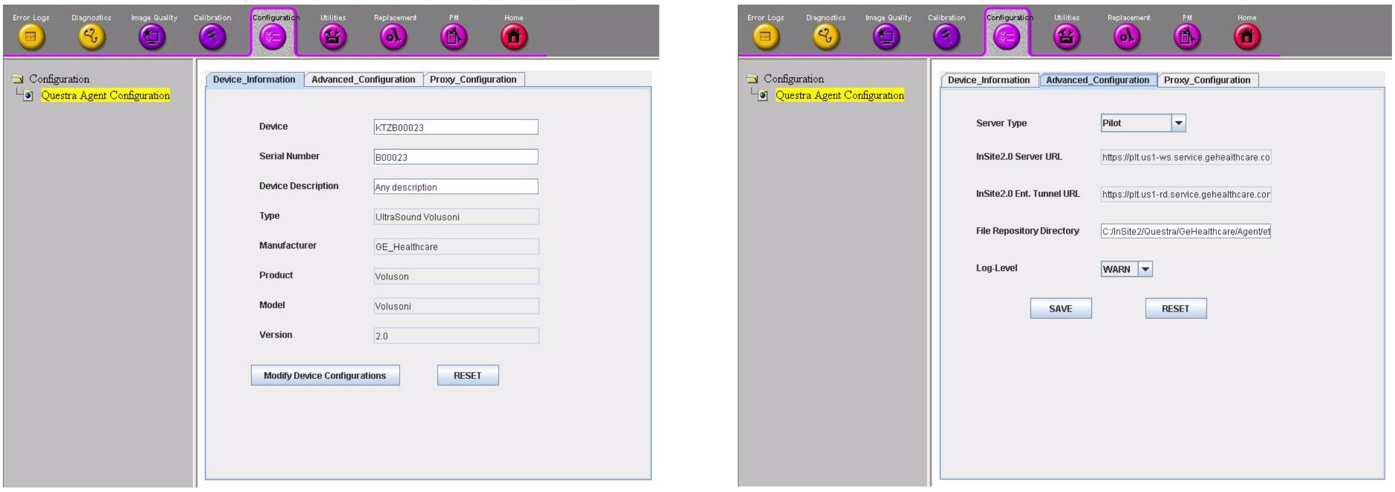
System Service Section System Information

System Location	not set
System Type	Voluson i
System IP Address	3.249.7.134
Application Status	Running

Use the top level buttons to access System Service Utilities

Figure 7-10 Common Service Desktop - Home

7-5-3 CSD: Configuration


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Configuration
Questra Agent Configuration
Device_Information
Advanced_Configuration
Proxy_Configuration
Modify Device Configurations
RESET
SAVE
RESET

Device: KTZB00023
Serial Number: B00023
Device Description: Any description
Type: UltraSound Volusoni
Manufacturer: GE_Healthcare
Product: Voluson
Model: Volusoni
Version: 2.0

Server Type: Pilot
InSite2.0 Server URL: https://plt.us1-ws.service.gehealthcare.co
InSite2.0 Ent. Tunnel URL: https://plt.us1-rd.service.gehealthcare.cor
File Repository Directory: C:/InSite2/Questra/GeHealthcare/Agent/et
Log-Level: WARN

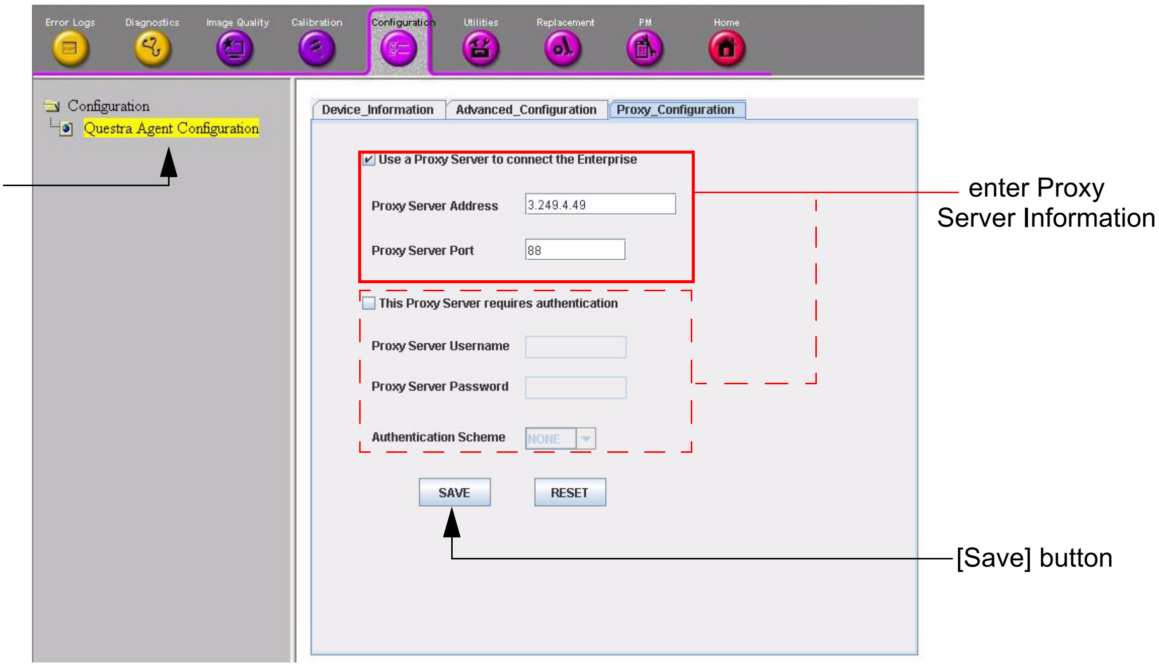
Figure 7-11 CSD - Configuration: Device Information / Advanced Configuration

Figure 7-11, above shows the [Device Information] and [Advanced Configuration] tab in the Questra Agent Configuration menu. This pages normally do not have to be modified.

7-5-3-1 To configure Service Platform

NOTICE If a Proxy server is available, the **information has to be properly entered, otherwise Questra remote control does not work**. There is no possibility to detect proxy server information automatically.

1.) Ask the hospital’s network Administrator for the Proxy Server Address and the Proxy Server Port.
2.) Select the **Configuration** page, then double-click “Questra Agent Configuration”.
3.) Select the [Proxy_Configuration] tab and enter Proxy Server Address and Proxy Server Port.


Error Logs
Diagnostics
Image Quality
Calibration
Configuration
Utilities
Replacement
PM
Home
Configuration
Questra Agent Configuration
Device_Information
Advanced_Configuration
Proxy_Configuration
enter Proxy Server Information
SAVE
RESET
[Save] button

☑ Use a Proxy Server to connect the Enterprise
Proxy Server Address: 3.249.4.49
Proxy Server Port: 88
☐ This Proxy Server requires authentication
Proxy Server Username:
Proxy Server Password:
Authentication Scheme: NONE

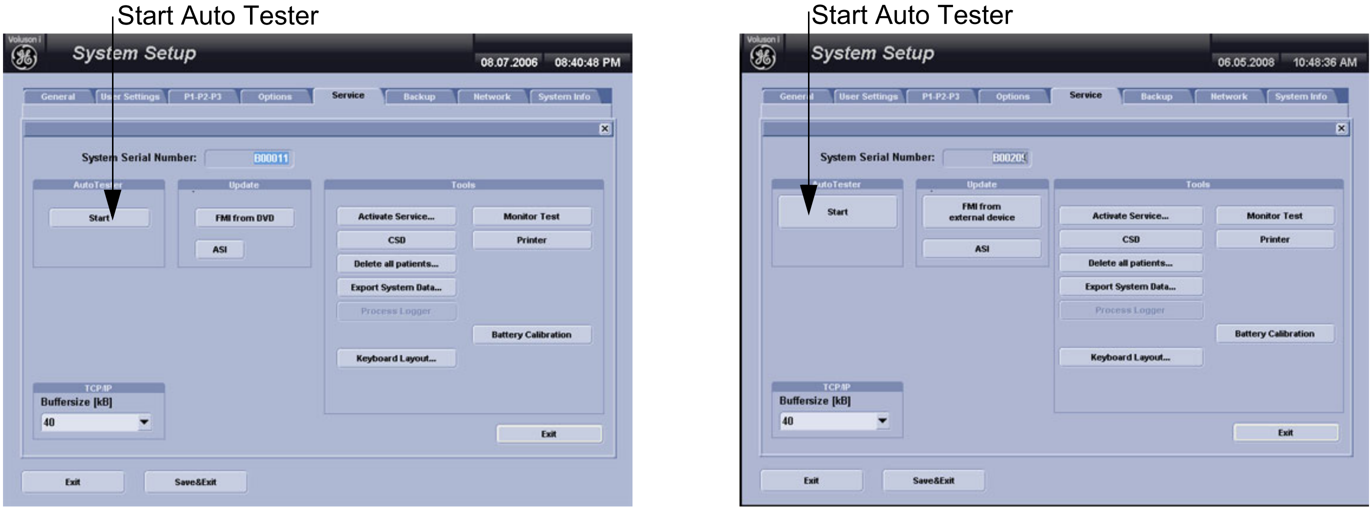
Figure 7-12 CSD - Configuration: Proxy Configuration

4.) Click the SAVE button and then close the service page.

Section 7-6
How to use the Auto Tester program

NOTE: Startup the system. Before starting an exam Auto Tester must be turned on. Immediately after occurrence of the issue you need to stop the Auto Tester and save the results! In case of a system shut down, the Auto Tester stops automatically and the results will not be saved!

1.) Press the **UTILITIES** key and select the SYSTEM from the menu area on the left side of the screen.
2.) Select the SERVICE page on the screen. The “password window” appears automatically.
3.) Enter the password SHE and click the ACCEPT button to display the Service Tools window.


Start Auto Tester
System Setup
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
AutoTester
Start
Update
FMI from DVD
FMI from external device
ASI
Tools
Activate Service...
Monitor Test
CSD
Printer
Delete all patients...
Export System Data...
Process Logger
Battery Calibration
Keyboard Layout...
TCP/IP
Buffersize [kB]
40
Exit
Save&Exit
Start Auto Tester

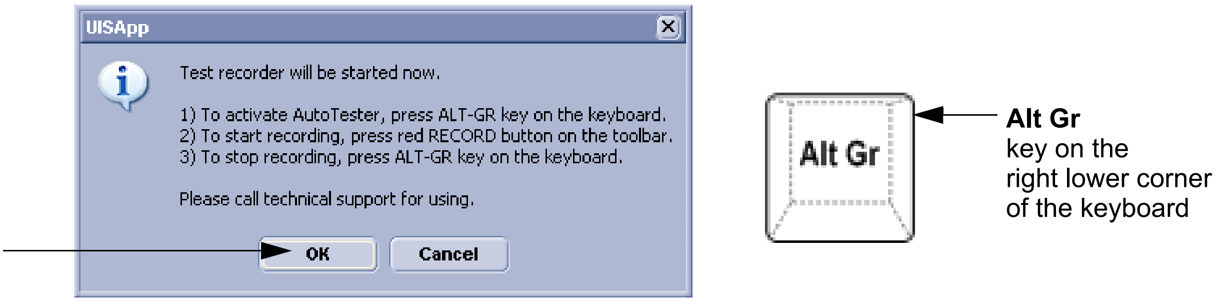
with Software 6.x.x and 7.x.x

with Software 8.x.x

Figure 7-13 Service Tools window

4.) Activate the “Auto Tester” program by clicking the START button.

The following message box appears.


UISApp
OK
Cancel
Alt Gr

Test recorder will be started now.

1) To activate AutoTester, press ALT-GR key on the keyboard.
2) To start recording, press red RECORD button on the toolbar.
3) To stop recording, press ALT-GR key on the keyboard.

Please call technical support for using.

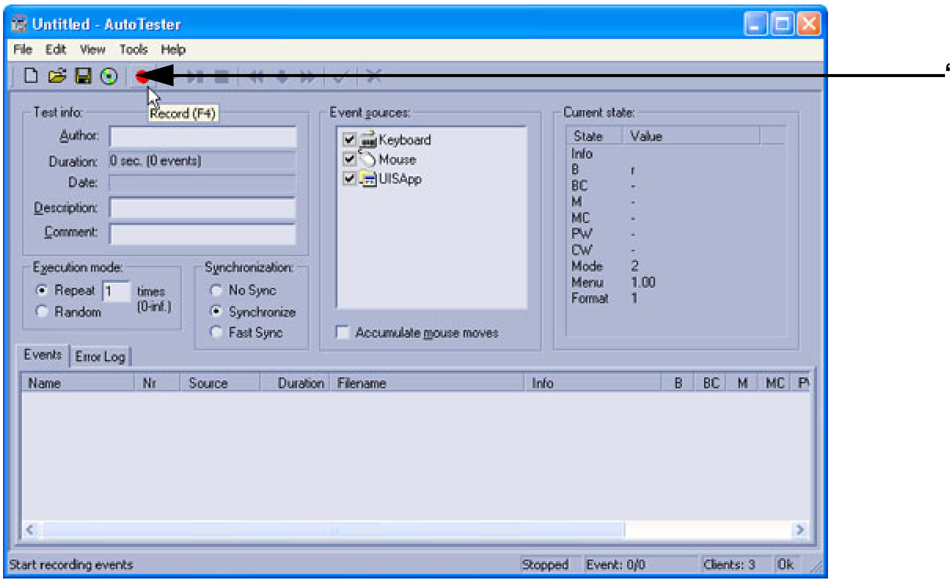
Alt Gr
key on the
right lower corner
of the keyboard

Figure 7-14 Message Box

5.) Click OK.
6.) Press the **ALT GR** key on the alphanumeric keyboard.

Section 7-6 How to use the Auto Tester program (cont'd)

7.) Activate the "Auto Tester" program by clicking the "Record" icon on the displayed screen.

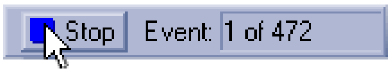

Untitled - AutoTester
File Edit View Tools Help
Record (F4)
Test info:
Author:
Duration: 0 sec. (0 events)
Date:
Description:
Comment:
Execution mode:
● Repeat 1 times (0-inf.)
○ Random
Synchronization:
○ No Sync
● Synchronize
○ Fast Sync
Event sources:
☑ Keyboard
☑ Mouse
☑ UISApp
☐ Accumulate mouse moves
Current state:
State Value
Info
B r
BC -
M -
MC -
PW -
CW -
Mode 2
Menu 1.00
Format 1
Events Error Log
Name Nr Source Duration Filename Info B BC M MC PV
Start recording events
Stopped Event: 0/0 Clients: 3 Ok

"Record" icon

Figure 7-15 Start Auto Tester

8.) Start scanning.
You can scan normally and everything will be recorded to the program (up to several hours).

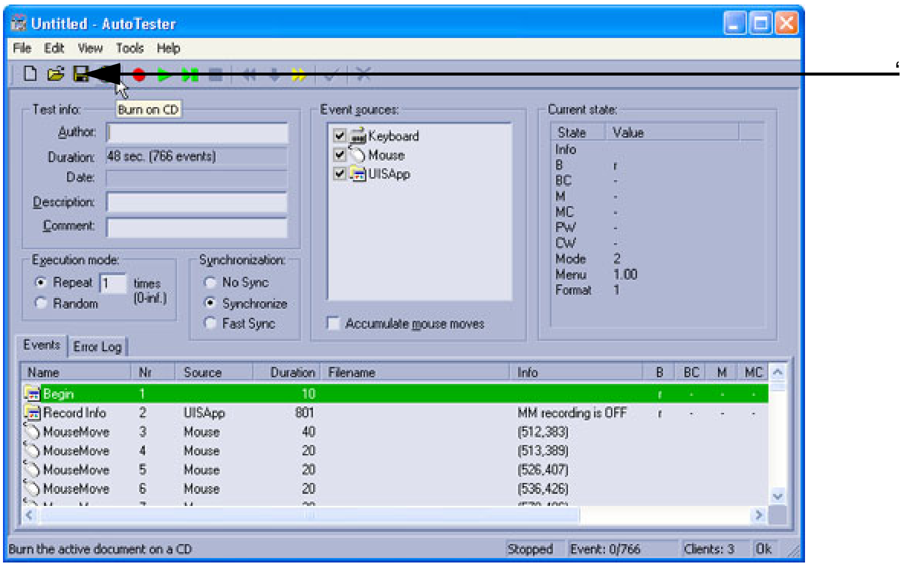
NOTE: It is important that you are recording the processes where the errors normally occur.


Stop
Event: 1 of 472

Stop the program by clicking on [**Stop**] shown on the screen, or by pressing the [**ALT GR**] key on the alphanumeric keyboard.

Figure 7-16 Stop Autotester

The following screen will appear.


Untitled - AutoTester
File Edit View Tools Help
Burn on CD
Test info:
Author:
Date:
Description:
Comment:
Execution mode:
● Repeat 1 times (0-inf.)
○ Random
Synchronization:
○ No Sync
● Synchronize
○ Fast Sync
Event sources:
☑ Keyboard
☑ Mouse
☑ UISApp
☐ Accumulate mouse moves
Current state:
State Value
Info
B r
BC -
M -
MC -
PW -
CW -
Mode 2
Menu 1.00
Format 1
Events Error Log

Duration: 48 sec. (766 events)

Name	Nr	Source	Duration	Filename	Info	B	BC	M	MC
Begin	1		10			r	-	-	-
Record Info	2	UISApp	801		MM recording is OFF	r	-	-	-
MouseMove	3	Mouse	40		(512,383)				
MouseMove	4	Mouse	20		(513,389)				
MouseMove	5	Mouse	20		(526,407)				
MouseMove	6	Mouse	20		(536,426)				

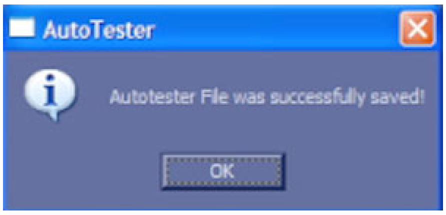
Burn the active document on a CD
Stopped Event: 0/766 Clients: 3 Ok

"**Disc**" icon

Figure 7-17 Auto Tester Finished

Section 7-6 How to use the Auto Tester program (cont'd)

9.) Maybe have it read to save the file, press the “Disc” icon, the following screen will appear:

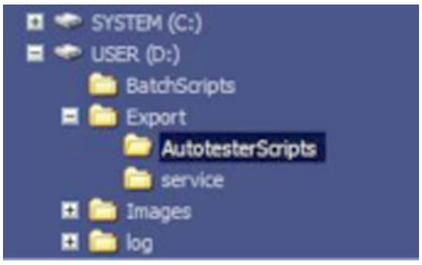


AutoTester

Autotester File was successfully saved!

Figure 7-18 Auto Tester

10.)The file will be saved in D:\Export\AutotesterScripts\*.*.



SYSTEM (C:)
USER (D:)
BatchScripts
Export
AutotesterScripts
service
Images
log

Figure 7-19 saved file

11.)**ALT** + **D** contains the needed logs.

NOTE: *To analyze the workflow the exact date and time of occurrence needs to be documented!*

7-6-1 Limitation of the Auto Tester

The following infomation will not be recorded, depending on the moment the Auto Tester is activated so this must be provided by the customer of the FSE:

- Which probe is in use and which probes are connected?
- Which Mode is activated?
- Which peripherals are connected (Dicom®, Printer, etc..)?

NOTE: *The standalone recorded “Auto Tester” file makes only sense with the* **ALT** + **D** *Log!*

Collected information from all steps above can be sent to the Make Center. With this infomation the Make Center can see how the customer is using the system and reproduce potential failures.

Providing all information at once will help the Make Center find the root cause and speeds up finding a solution for the customer.

Section 7-7
Minimum Configuration to Boot/Scan

7-7-1 Booting without using the Ultrasound Hardware

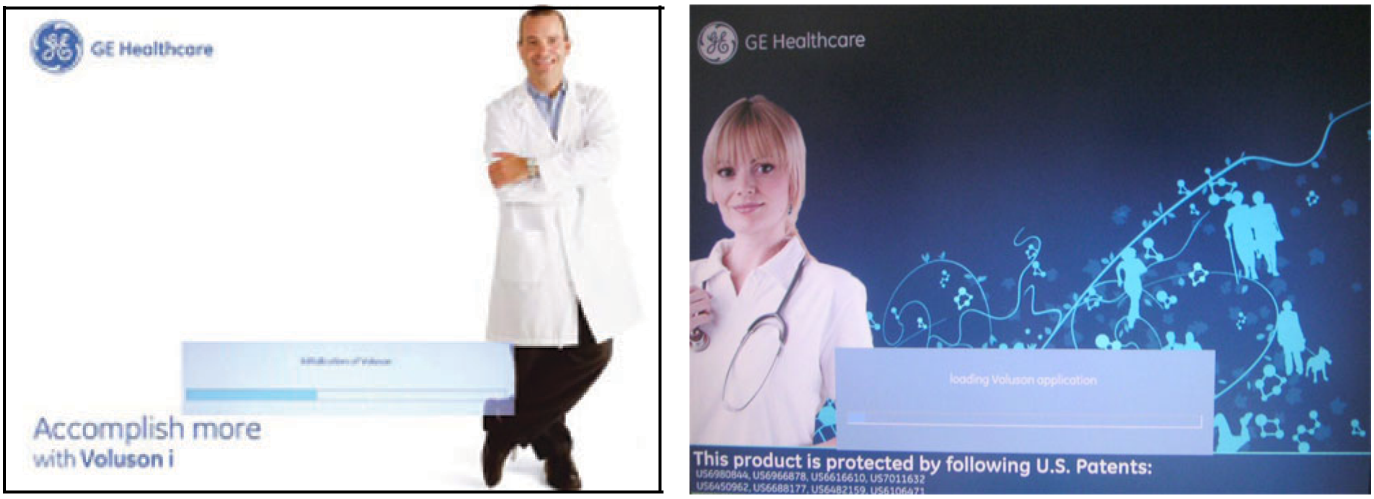
If the low-level ultrasound hardware is failing, the application can not be initialized correctly. Consequently, proper boot-up of the system is prevented.

By steadily pressing the H key on the alphanumeric keyboard during startup, the application can be started, even if the ultrasound-hardware is broken.
The hardware is not initialized; the application simply does not get ultrasound data into process. However, one can use SonoView to save images and to gather system information by saving a “Full Backup”. The remote service capabilities are also present.

Operation:

1.) Power On / Boot Up the system as described in Section 3-6-2 on page 3-69.

2.) As soon as the start-up process bar indicates **“Initialization of Voluson”**, press the H key on the alphanumeric keyboard.

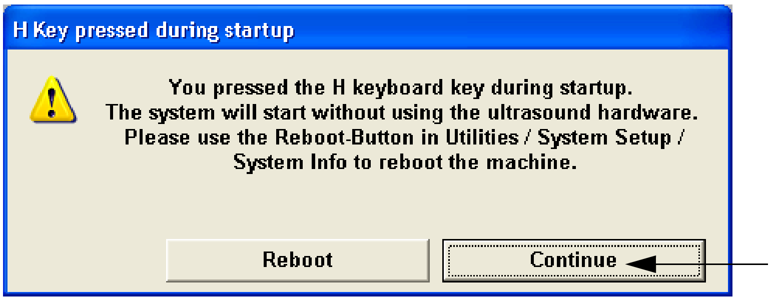

GE Healthcare
Accomplish more
with Voluson i
GE Healthcare
loading Voluson application
This product is protected by following U.S. Patents:

with Software 6.x.x and 7.x.x

with Software 8.x.x and higher

Figure 7-20 Start-up bar: “Initialization of Voluson”

3.) **Keep the H key pressed during complete startup** (~ 1 minutes). Following message appears:



H Key pressed during startup

You pressed the H keyboard key during startup.
The system will start without using the ultrasound hardware.
Please use the Reboot-Button in Utilities / System Setup / System Info to reboot the machine.

Figure 7-21

4.) Click on CONTINUE. The “Probe Selection” menu appears on the monitor.

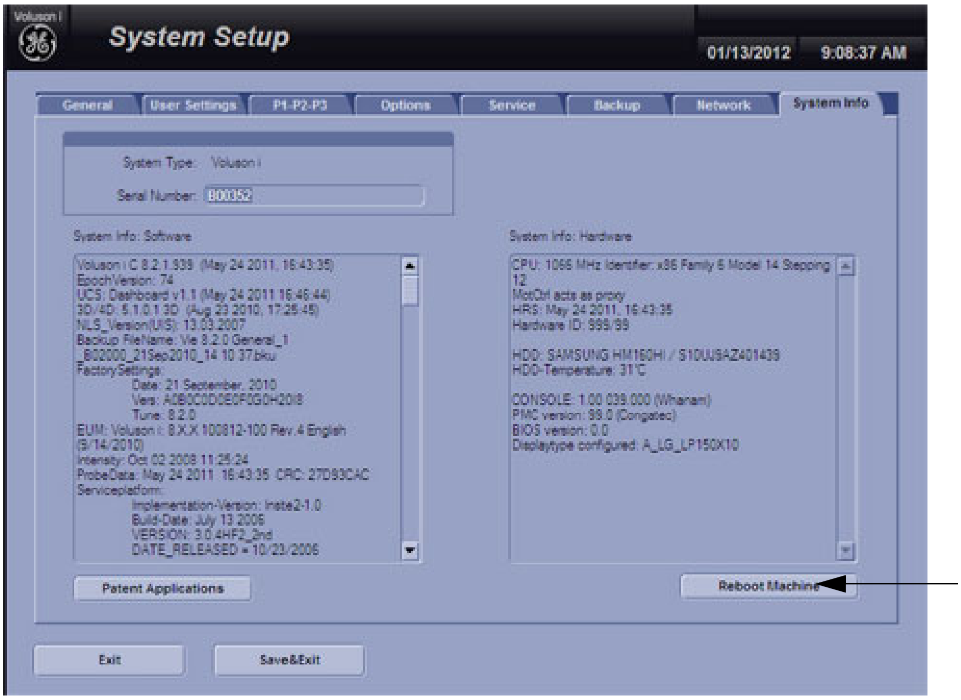
5.) Press the **FREEZE** key. The application starts, but does not show any Ultrasound information.

6.) Backup all images via SonoView, see: Section 4-5-6 "Archiving Images" on page 4-37.

7-7-1 Booting without using the Ultrasound Hardware (cont'd)

7.) Save a "Full Backup" as described in Section 4-5-3 on page 4-32, or press the **ALT** + **D** key to gather detailed information and data from the system, see: Section 7-4-2-1 on page 7-9.

8.) Press **UTILITIES**, choose SYSTEM, select the **SYSTEM INFO** page and click REBOOT MACHINE.


Voluson i
System Setup
01/13/2012
9:08:37 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Patent Applications
Reboot Machine
Exit
Save&Exit

System Type: Voluson i

Serial Number: B00352

System Info: Software

```
Voluson i C 8.2.1.939  (May 24 2011, 16:43:35)
EpochVersion: 74
UCS: Dashboard v1.1 (May 24 2011 16:46:44)
3D/4D: 5.1.0.1 3D  (Aug 23 2010, 17:25:45)
NLS_Version(UIS): 13.03.2007
Backup FileName: Vie 8.2.0 General_1
_B02000_21Sep2010_14 10 37.bku
FactorySettings:
        Date: 21 September, 2010
        Vers: A0B0C0D0E0F0G0H20I8
        Tune: 8.2.0
EUM: Voluson i: 8.X.X 100812-100 Rev.4 English
(9/14/2010)
Intensity: Oct 02 2008 11:25:24
ProbeData: May 24 2011  16:43:35  CRC: 27D93CAC
Serviceplatform:
        Implementation-Version: Insite2-1.0
        Build-Date: July 13 2006
        VERSION: 3.0.4HF2_2nd
        DATE_RELEASED = 10/23/2006
```

System Info: Hardware

```
CPU: 1066 MHz Identifier: x86 Family 6 Model 14 Stepping
12
MotCtrl acts as proxy
HRS: May 24 2011, 16:43:35
Hardware ID: 999/99

HDD: SAMSUNG HM160HI / S10UJ9AZ401439
HDD-Temperature: 31°C

CONSOLE: 1.00.039.000 (Whanam)
PMC version: 99.0 (Congatec)
BIOS version: 0.0
Displaytype configured: A_LG_LP150X10
```

Figure 7-22 Reboot Machine

Section 7-8
Troubleshooting Trees and Instructions

Table 7-6 below outlines the Voluson i / Voluson e troubleshooting trees and instructions shown in the sub-sections.

Table 7-6 Troubleshooting Trees and Instructions

Sub-section	Description	Page Number
7-8-1	Noise in 2D Mode	7-20
7-8-2	Noise in Color Flow Mode	7-21
7-8-3	Trackball - Impaired Sensitivity	7-22
7-8-4	Printer Malfunction	7-23
7-8-5	DVD/CD+R/RW Drive Malfunction	7-24
7-8-6	Network Troubleshooting	7-26

7-8-1 Noise in 2D Mode

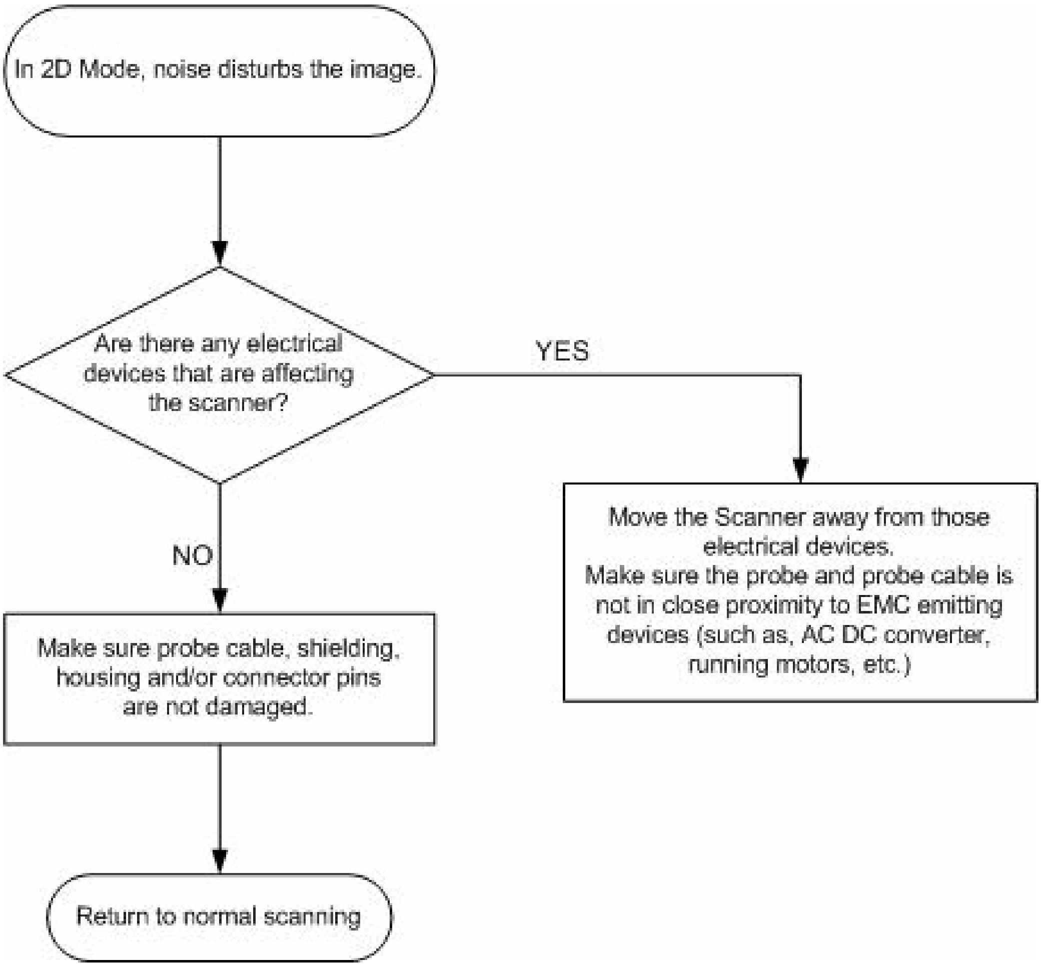

In 2D Mode, noise disturbs the image.
Are there any electrical devices that are affecting the scanner?
YES
Move the Scanner away from those electrical devices.
Make sure the probe and probe cable is not in close proximity to EMC emitting devices (such as, AC DC converter, running motors, etc.)
NO
Make sure probe cable, shielding, housing and/or connector pins are not damaged.
Return to normal scanning

Figure 7-23 Noise in 2D Mode

7-8-2 Noise in Color Flow Mode

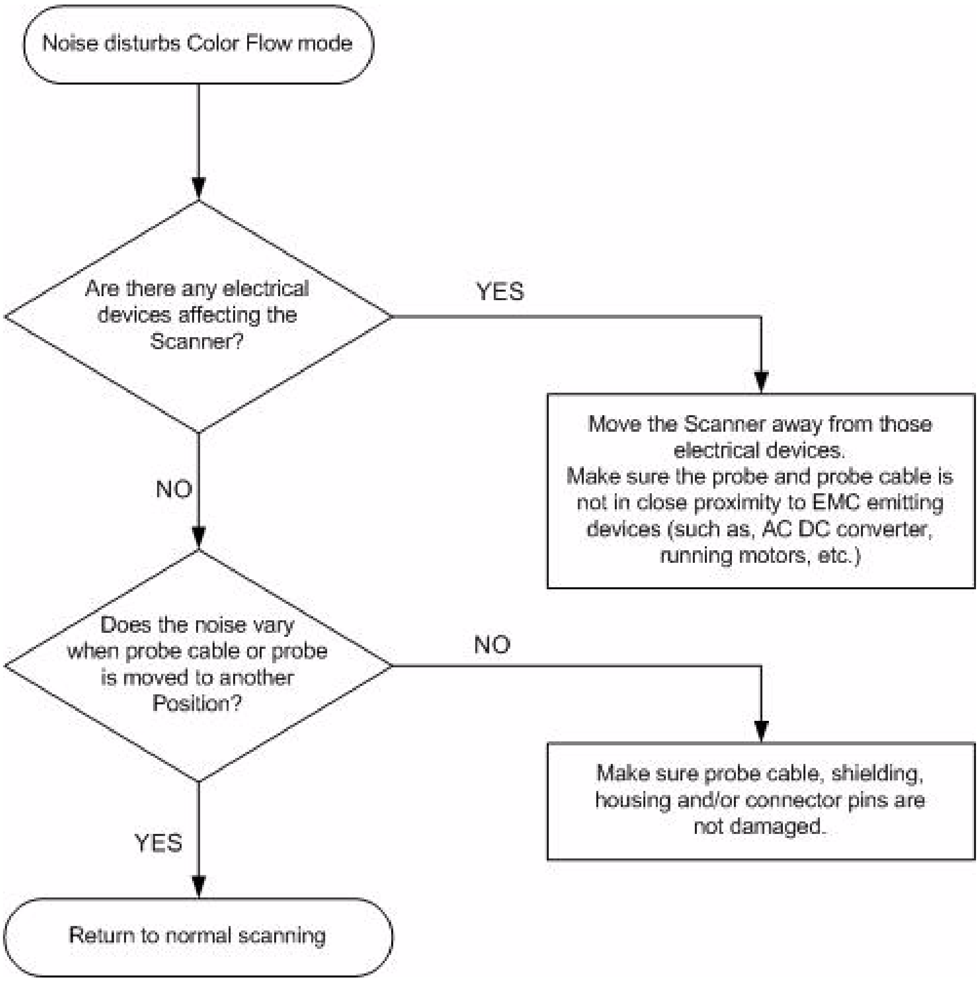

Noise disturbs Color Flow mode
Are there any electrical devices affecting the Scanner?
YES
Move the Scanner away from those electrical devices.
Make sure the probe and probe cable is not in close proximity to EMC emitting devices (such as, AC DC converter, running motors, etc.)
NO
Does the noise vary when probe cable or probe is moved to another Position?
NO
Make sure probe cable, shielding, housing and/or connector pins are not damaged.
YES
Return to normal scanning

Figure 7-24 Noise in Color Flow Mode

7-8-3 Trackball - Impaired Sensitivity

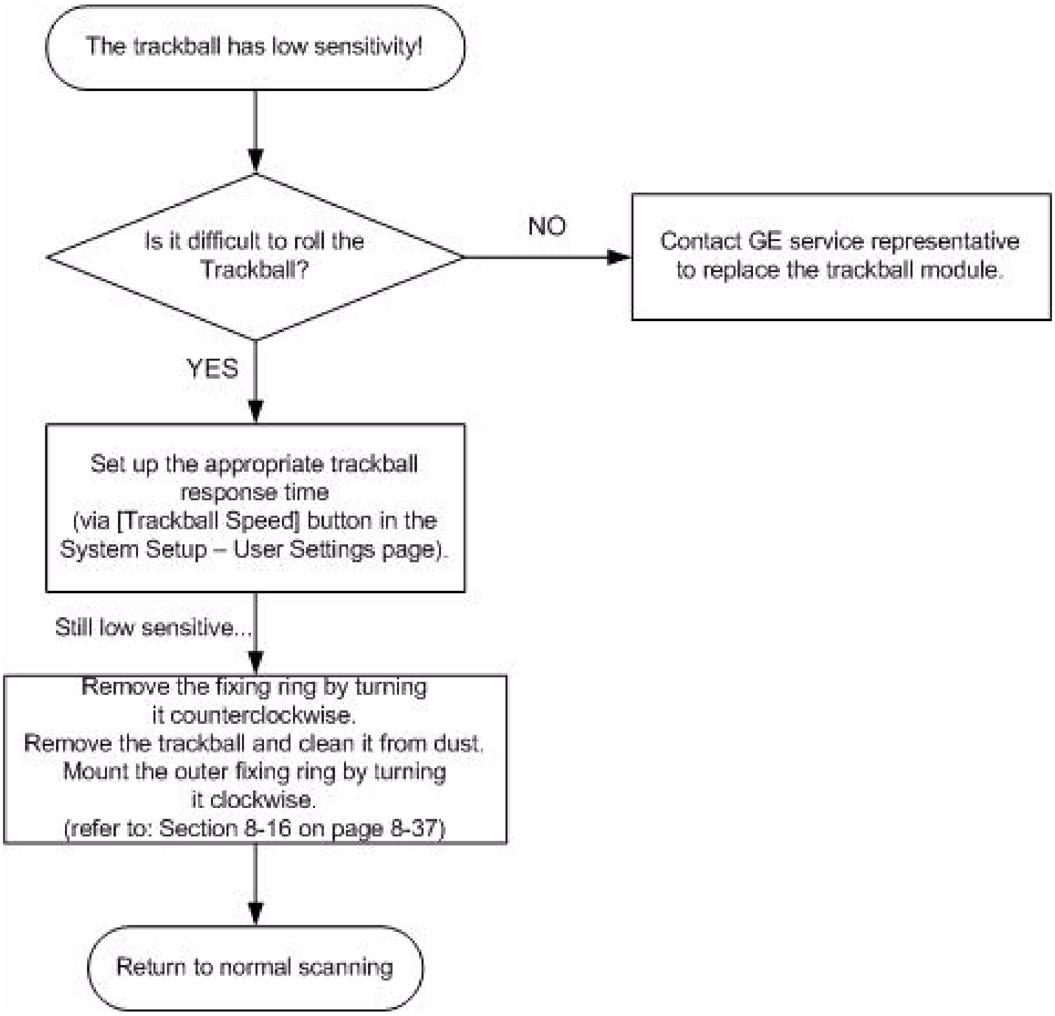

The trackball has low sensitivity!
Is it difficult to roll the Trackball?
NO
Contact GE service representative to replace the trackball module.
YES
Set up the appropriate trackball response time (via [Trackball Speed] button in the System Setup – User Settings page).
Still low sensitive...
Remove the fixing ring by turning it counterclockwise. Remove the trackball and clean it from dust. Mount the outer fixing ring by turning it clockwise. (refer to: Section 8-16 on page 8-37)
Return to normal scanning

Figure 7-25 Trackball - Impaired Sensitivity

7-8-4 Printer Malfunction

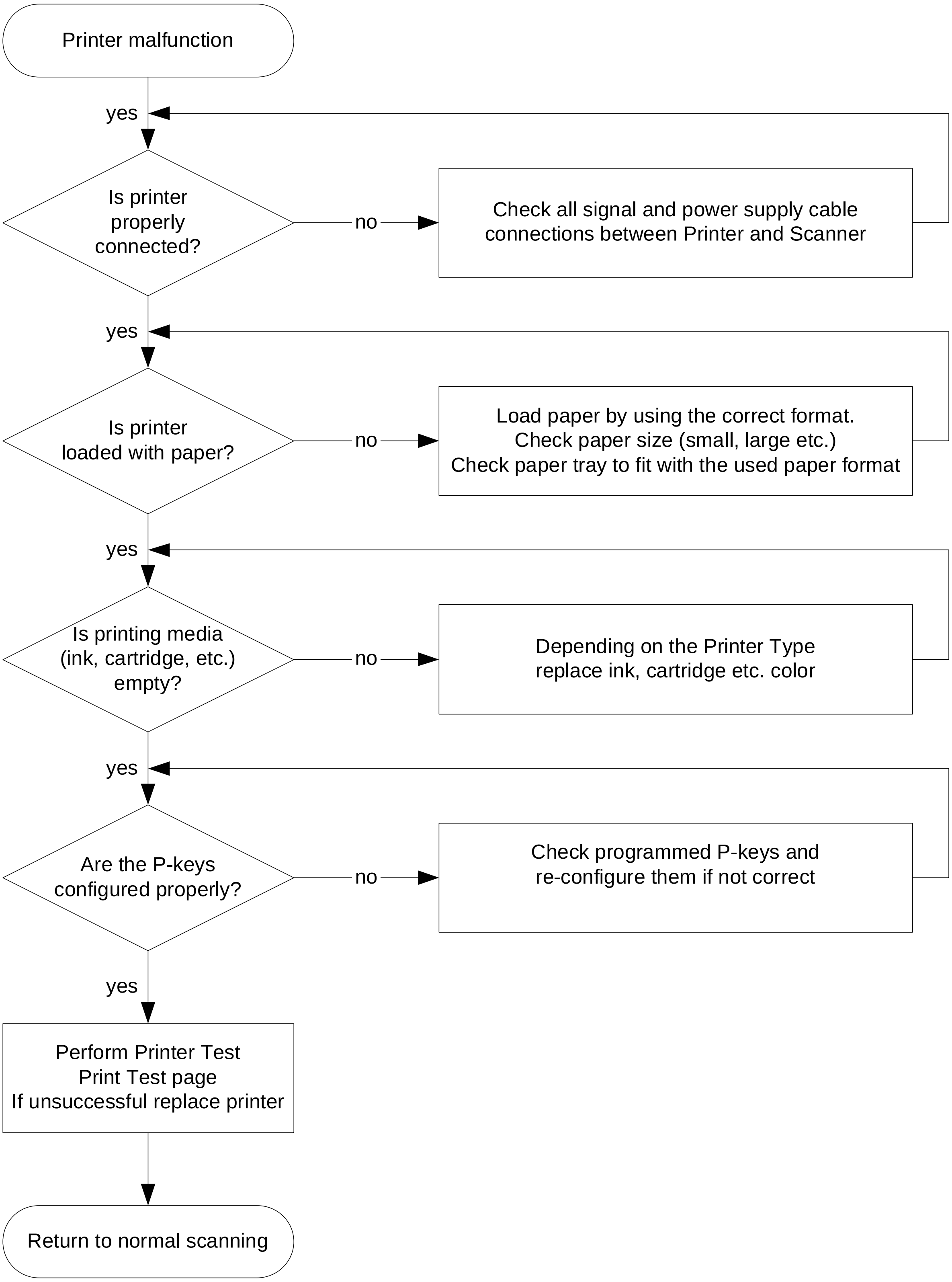

Printer malfunction
yes
Is printer properly connected?
no
Check all signal and power supply cable connections between Printer and Scanner
yes
Is printer loaded with paper?
no
Load paper by using the correct format.
Check paper size (small, large etc.)
Check paper tray to fit with the used paper format
yes
Is printing media (ink, cartridge, etc.) empty?
no
Depending on the Printer Type replace ink, cartridge etc. color
yes
Are the P-keys configured properly?
no
Check programmed P-keys and re-configure them if not correct
yes
Perform Printer Test
Print Test page
If unsuccessful replace printer
Return to normal scanning

Figure 7-26 Printer Malfunction

7-8-5 DVD/CD+R/RW Drive Malfunction

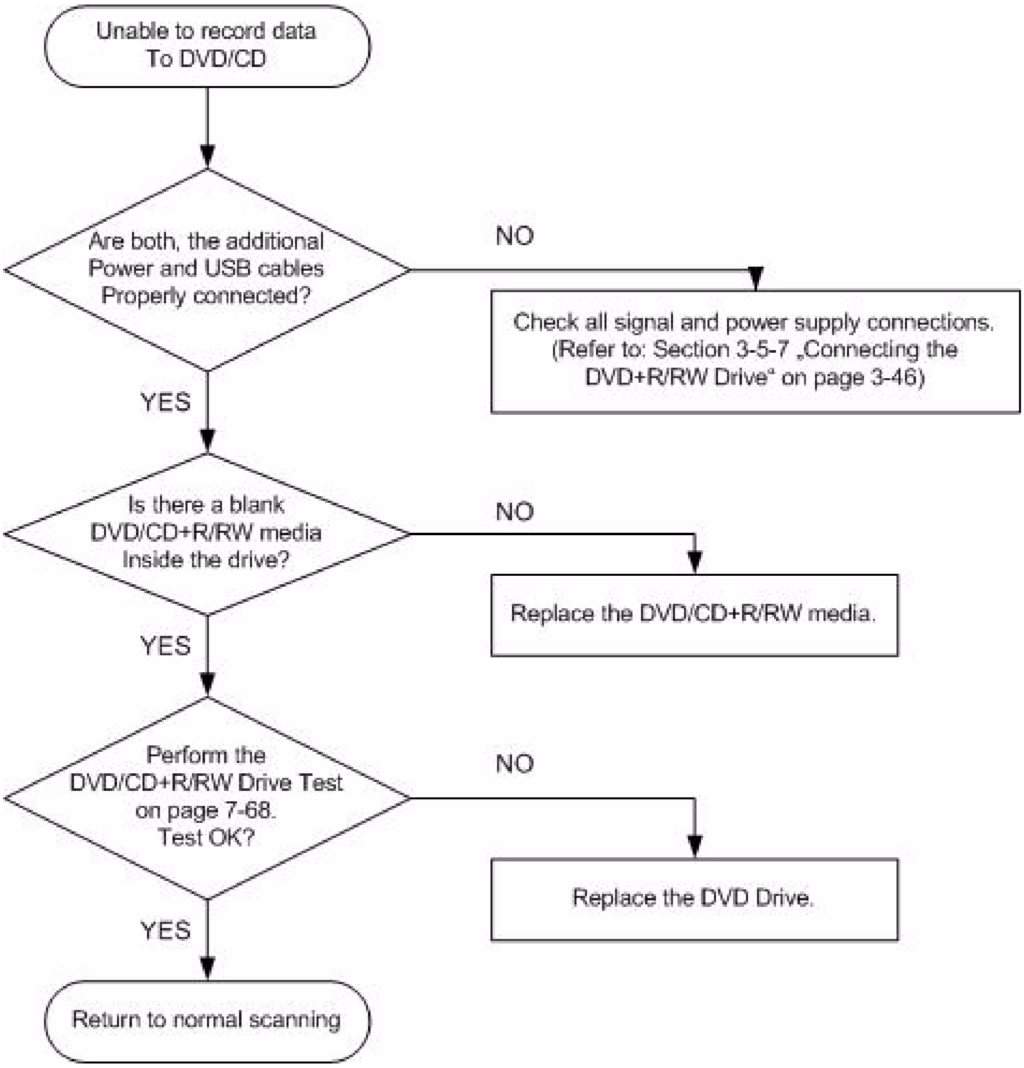
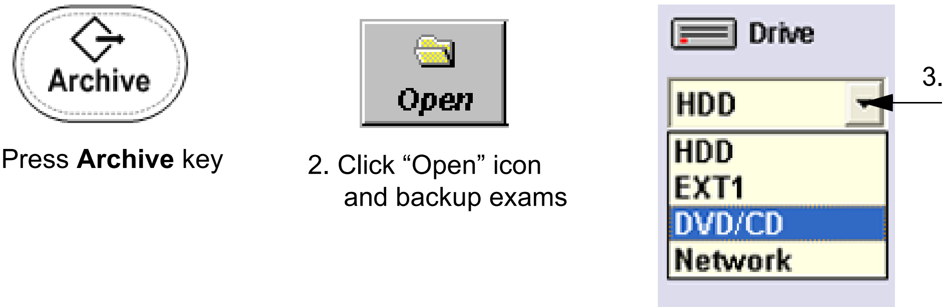

Unable to record data
To DVD/CD
Are both, the additional Power and USB cables Properly connected?
NO
Check all signal and power supply connections. (Refer to: Section 3-5-7 „Connecting the DVD+R/RW Drive“ on page 3-46)
YES
Is there a blank DVD/CD+R/RW media Inside the drive?
NO
Replace the DVD/CD+R/RW media.
YES
Perform the DVD/CD+R/RW Drive Test on page 7-68. Test OK?
NO
Replace the DVD Drive.
YES
Return to normal scanning

Figure 7-27 DVD/CD+R/RW Drive Malfunction

7-8-5-1 DVD/CD+(R)W Drive Test

1.) Insert an empty DVD/CD+(R)W into the Drive.
2.) Enter “Sonoview” by pressing the **ARCHIVE** key on the control panel; see Figure 7-28.
3.) Click the “Open” icon to display the list of exams.
4.) Select exam(s) and backup them to DVD/CD+(R)W.
5.) Choose “DVD/CD” Drive.
6.) The images, which you have choosen during backup should be visible.



1. Press **Archive** key

2. Click “Open” icon and backup exams

3. After Backup, choose DVD/CD

Figure 7-28 To backup exams to DVD/CD+(R)W

7-8-6 Network Troubleshooting

7-8-6-1 No Connection to the Network at All

1.) Check that the network cable between the scanner and the wall network is connected and well seated in both ends. (Use a network cable that is known to be OK.)

2.) Connect a network cable between your Scanner and your PC. Try to ping from the Scanner to the IP address on the PC. If OK, the hardware connection inside the Scanner is OK.

7-8-6-2 GE remote service connection

The customer gets visual information about the network status (shown in the status area on the right side of the screen). The network status is defined as follows:

NO ICON - Cable disconnected or no network signal on a connected cable.

GREEN - Cable connected to a network. **Does not imply** proper network settings.

BLUE - All the following processes are active: UL_VNC, UL_Telnet or UL_CSD.
These processes are used when remote access is active, so they are used as an indicator.

NOTE: The status is checked every 10 seconds, regardless whether you‘re in read or write mode.

Section 7-9
Error Messages

⚠ **NOTICE** If the problem (error message) still exists after performing the described actions, call technical support.

Error Messages	Actions
AcousticUnitType not supported by BF_Interface:	restart the system
AcquMode - incorrect BBC_Wnd pointer	restart the system
Array bounds exceeded	restart the system
Attempt to read Probe-ID from an invalid probe connector.	restart the system.
AVI Save function fails	check the Power cable - restart the machine and try again
B_Enhance Out Of Range	press ok and save this user-setting once again
B_Gain Out Of Range	press ok and save this user-setting once again
B_Reject Out Of Range	press ok and save this user-setting once again
B_TxFocus - not calculated and B_SHOT_PART_ON	restart the system
BBC_Acquisition Wnd - block creation failed	restart the system
BBC_Acquisition Wnd - incorrect ReplayCtrl-object	restart the system
BBC_Archive Wnd - incorrect ReplayCtrl-object	restart the system.
Backup error while writing. (Error during writing of backup data.)	check storage destination for Full Backup (e.g., DVD/CD not empty, insufficient rights on target Network drive, write protection on USB-drive)
Backup error while verifying. (Checksum mismatch)	repeat backup
BC Ensemble Out Of Range	press ok and save this user-setting once again
BC lines_per_sequenz < 1	restart the system
BC lines_per_sequenz < 2	restart the system
BC_Dynamic Out Of Range	press ok and save this user-setting once again
BC_Gain Out Of Range	press ok and save this user-setting once again
BC_Lines: BC_LineDensity out of limit	restart the system
BCMC_Balance Out Of Range	press ok and save this user-setting once again
bCP_ConvertParameters failed	restart the system
bCP_ProcessIQEnsemblePacket failed	restart the system
bCP_ProcessIQMModePacket failed	restart the system
B-DynContrast Out Of Range	press ok and save this user-setting once again
BF: can't set BM RxApod	restart the system

Error Messages	Actions
BF: can´t set C Rx Apod	restart the system
BF: can't set D RxApod	restart the system
binary file not found	restart the system
Binary path not set	restart the system
BM_Resample: overrun SampleLengthOnLineMem	restart the system
bPWCW_ProcessPWCWData in RT_PWorCWFilterBlock::bFilteredSamplesToWorkingBuffer() returned error code xxx	restart the system
Cannot create instance	restart the system
Cannot read a valid Probe-ID (xxx) from………….	disconnect and reconnect the probe
Cannot import volume data to 3D dll	load volume files from other storage medium
Can't add chosen files to the virtual folders!	restart the system
Can't create hardware configuration index file in D:\\SERVICE	restart the system
Can't detect PCI 9054	restart the system
Can't import disc session!	use a new DVD/CD+R to write data to DVD/CD
Can't open file: ……	restart the system
Can't open:	restart the system
Can't open: C:\V730\Distribution\Hardware\patterndat.bin	restart the system
CHA PulseInversion flag for this Probe is not set	restart the system
Cine2D_CtrlBlock::vSetState: value of m_GIP_eCineType undefined!!	restart the system
Cine2D_CtrlBlock::vSetState: value of m_pGIP_eR_W_Mode undefined!!	restart the system
Communication thread is dead!	restart the system; check connection from system to VCR, VCR has power and is on
ConManager - RC_ConstructGOPs: Memory allocation failed	restart the system
CPF Hardware not found	restart the system
CPI-mode is only with curved probe\nAction: Contact R&D	restart the system
CPS_InterfaceToHW::vSet_VOL_MODE -- incorrect value for ColorDMA_Active	restart the system
CPS_InterfaceToHW::vSet_VOL_MODE -- incorrect value for EndOfFrameInt	restart the system
CPS_InterfaceToHW::vSet_VOL_MODE -- incorrect value for LongLineMemFIFO	restart the system
CPS_InterfaceToHW::vSet_VOL_MODE -- incorrect value for Mode_4D	restart the system

Error Messages	Actions
CRI: mismatch in steering angle header info	restart the system
CtrlMvGrpRepresentations::isInWriteMode not supported for mode nr xx	restart the system
CW Archive::not implemented	restart the system
CW quant TX Frequ out of range	restart the system
CW_BaseLinePos Out Of Range	press ok and save this user-setting once again
CW_Gain Out Of Range	press ok and save this user-setting once again
CW-hardware doesn't support	pencil probe + CW-Hardware not available->HW problem
CW-HW-PRF == 0	restart the system
CW-TxFrequency == 0	restart the system
D:\\SERVICE\\ConfIndexFile is corrupt	restart the system
Data are not saved to Sonoview or sent to DICOM Server!	restart the system
Datatype misalignment	restart the system
dDistanceFocusReferenceBF_ToProbeSurface out of valid range	restart the system
Delete error (Backup data could not be deleted.)	check storage destination of Full Backup (e.g., DVD/CD, insufficient rights on target Network drive, write protection on USB-drive)
Density Out Of Range	press ok and save this user-setting once again
Different software error (Backup data was made on another system with a different software version.)	This backup cannot be restored by the user.
Disc is full!	use a new CDR for writing data to CD
Display:Rect Region fails	restart the system
Division by zero	restart the system
done is low!	restart the system
Doppler-Txfrequency out of range	restart the system
Downgrade error (Backup data was made with a software version higher than the installed version.)	load appropriate backup for installed version
DSP - Gamma Corr - Load Data Timeout	restart the system
DSP - HilbertCoeff - Load Data Timeout	restart the system
DSP - Low Pass Coeff - Load Data Timeout	restart the system
DSP - SetFFT_Para - Load Data Timeout	restart the system
DSP - SetWMF_Koeff - Load Data Timeout	restart the system
DSP/MSE:Hanning-Window Load Data Timeout	restart the system
ECG_Consumer : memory allocation failed	restart the system

Error Messages	Actions
Electronic user manual not installed. Please install.	install Electronic User Manual (EUM) and try it again
End Bandwidth too big	restart the system
End ET too big	restart the system
End frequency too big	restart the system
Enhance Out Of Range	press ok and save this user-setting once again
Error in File: ….	restart the system
Error in Select Tx-channel for B-mode	restart the system
Error in Select Tx-channel for C-mode	restart the system
Error in Select Tx-channel for CW-mode	restart the system
Error in Select Tx-channel for PW-mode	restart the system
Error no HW present	restart the system
Error not enough time for BC shot!	restart the system
Error programming Flashcomplette	restart the system
Error setting state	restart the system
Error: can´t open Connection to MotCtrl DSP6712	restart the system
Error: Interrupt for MotCtrl DSP6712 doesn't work!	restart the system
Error: MotCtrl RS232 communication timeout	restart the system
Error: Unable to generate NLS keys.	repeat the activity
Execute privileged instruction	restart the system
FallSmooth Out Of Range	press ok and save this user-setting once again
File Could not CRC Check	load volume files from other storage medium
File CRC Error	load volume files from other storage medium
File CRC Missing	load volume files from other storage medium
File Data Missing	load volume files from other storage medium
File Datalength Not Consistent	load volume files from other storage medium
File Decompress Error	load volume files from other storage medium
File Decompress method Unknown	load volume files from other storage medium
File End Error	load volume files from other storage medium
File Memory Missing	load volume files from other storage medium
File Not Found	load volume files from other storage medium
File Pos	load volume files from other storage medium
File Read Error	load volume files from other storage medium

Error Messages	Actions
File Type Unknown	load volume files from other storage medium
File Volume size not consistent	load volume files from other storage medium
FilterBuffer memory allocation failed	restart the system
FLT: Denormal operand	restart the system
FLT: Divide by zero	restart the system
FLT: Invalid operation	restart the system
FLT: Overflow	restart the system
FLT: Stack overflow	restart the system
FLT: Underflow	restart the system
GeoDescription3D_TissueCF::operator=: handed over argument is not of same type, dynamic cast failed!!	restart the system
GeoDescriptionMotion Constructor: unknown mode Parameter handed over	restart the system
GeoDescriptionMotion::operator=: handed over argument is not of same type, dynamic cast failed!!	restart the system
GeoDescriptionPWMode::operator=: handed over argument is not of same type, dynamic cast failed!!	restart the system
GeoDescriptionTissueCF Constructor: unknown mode Parameter handed over	restart the system
GeoDescriptionTissueCF::operator=: handed over argument is not of same type, dynamic cast failed!!	restart the system
Hardware doesn't support CW-mode	pencil probe + CW-Hardware not available->HW problem
HardwareRelatedSoftware_Windows in write have different ProbeAcousticUnitIDs	disconnect all connected probes and connect them again; if not ok restart the system
HardwareRelatedSoftware_Windows in write have different ProbeScanFuncIDs	disconnect all connected probes and connect them again; if not ok restart the system
IBegrenzer.cpp BCshots no TxPulseEntrys	restart the system
IBegrenzer.cpp Bshots no TxPulseEntrys	restart the system
IBegrenzer.cpp Bshots TxMultiFocus problem	restart the system
IBegrenzer.cpp CWshots no TxPulseEntrys	restart the system
IBegrenzer.cpp MCshots no TxPulseEntrys	restart the system
IBegrenzer.cpp Mshots no TxPulseEntrys	restart the system
IBegrenzer.cpp Mshots TxMultiFocus problem	restart the system
IBegrenzer.cpp PWshots no TxPulseEntrys	restart the system
In the 3D Image Measure is not allowed	change to another format than 3D Fullscreen mode
Incorrect ReplayCtrl-Object	restart the system

Error Messages	Actions
incorrect VersionByte, xx of xx cycles OK	contact technical support
iPWCW_CloseProcessing in RT_PWorCWFilterBlock::execute() returned error code xx !!	restart the system
iPWCW_InitializeProcessing in RT_PWorCWFilterBlock::execute() returned error code xx !!	restart the system
iSetVideoSource(eVideoExtern) function fails	restart the system
iSetVideoSource(eVideoIntern) function fails	reboot the system
iSetVideoSource(eVideoIntern) function fails	the system will restart itself by pressing OK
LineFilt Out Of Range	press ok and save this user-setting once again
LP_KoefBlock: SamplePRF too big	restart the system
M_Gain Out Of Range	press ok and save this user-setting once again
M_Reject Out Of Range	press ok and save this user-setting once again
MC Ensemble Out Of Range	press ok and save this user-setting once again
MC_Balance Out Of Range	press ok and save this user-setting once again
MC_BaseLinePos Out Of Range	press ok and save this user-setting once again
MC_Dynamic Out Of Range	press ok and save this user-setting once again
MC_FallSmooth Out Of Range	press ok and save this user-setting once again
MC_Gain Out Of Range	press ok and save this user-setting once again
MC_RiseSmooth Out Of Range	press ok and save this user-setting once again
MCShotBuffer : not enough memory reserved	restart the system
M-DynContrast Out Of Range+	press ok and save this user-setting once again
Memory access violation	restart the system
memory allocation error	restart the system
missing BCMCPW_TxFocusData	restart the system
missing BM_TxFocusData	restart the system
missing CW_TxFocusData	restart the system
missing ProbeAcousticUnit, wrong ProbeAcousticUnitID.	restart the system
missing ProbeGeneral data - wrong ProbeID	restart the system
missing ProbeScanFunc - wrong ProbeScanFuncID	restart the system
MMC Archive::not implemented	restart the system
MotCtrl (DSP 6712): unknown or not (at the moment ?) supported 4D probe	restart the system
MotCtrl RS232 communication timeout	System will restart on OK. If problem persists please contact the technical support.

Error Messages	Actions
MotCtrl Unit: No probe reference position signal detected	Confirm the message by pressing the OK button and restart the system. Check functionality with a different 3D/4D probe. If the message appears again, please contact the technical support.
MotionColor-DSC 1st:Memory allocation failed	restart the system
MotionColor-DSC 2nd:Memory allocation failed	restart the system
Motion-DSC:Memory allocation failed	restart the system
MSG_ERROR_INIT_FAILED	Check connection from US machine to VCR, VCR has power and is on.
MSG_ERROR_NO_ACK	check VCR cables and try again
MSG_ERROR_NO_MEDIA	put cassette into drive of VCR
MSG_ERROR_NO_RESPONSE	check VCR cables, casette,... and try again
MSG_ERROR_WRITE_PROTECTED	remove cassette from VCR and put writeable cassette into drive of VCR.
No CD Writer found	check the connection and the Power cable - plug the cable off and on and try again. (restart the system)
No disc or device not ready!	insert disk, if fails again reboot and try again (with another disk)
Not enough space. (Not enough space on destination to hold the backup data.)	select another destination to save Full Backup
Overflow	restart the system
overview window creation failed	restart the system
Persistance Out Of Range	press ok and save this user-setting once again
Persistence coeff page index too big	restart the system
pGetActualUnitBuffer failed, RepresentationManager is not initialized	restart the system
pGetActualUnitBuffer failed, RepresentationManager is not initialized	restart the system
Please plug off and on probe and try again	plug of and on the probe and try again, plug it on a different probe connector.
PlxMemCheck ERROR	restart the system
pNextUnitCompleted failed, RepresentationManager is not initialized	restart the system
PowerManager: HRS not initialized	restart the system
PowerSpecBuffer memory allocation failed	restart the system
PRF_GeneratorBoundary: BBC Ensemble Limitation out of limit	restart the system
PRF_GeneratorBoundary: BBCPW Ensemble Limitation out of limit	restart the system

Error Messages	Actions
Probe Scan Function Not Supplied	restart the system
PW Archive::not implemented	restart the system
PW_BaseLinePos Out Of Range	press ok and save this user-setting once again
PW_BurstCalcBlock: UserProgApplication out of range	restart the system
PW_CW_FFT_FactBlock: DSC_ScrollX_Zoom darf nicht kleiner als eins sein!	restart the system
PW_Dynamic Out Of Range	press ok and save this user-setting once again
PW_Reject Out Of Range	press ok and save this user-setting once again
PWCW-DSC:Memory allocation failed	restart the system
PWGain Out Of Range	press ok and save this user-setting once again
PWM-Acoustic Value not defined	restart the system
RawDataSynthesizer : memory allocation failed	restart the system
ReplayCtrlInterface::vReconnect failed, selected movie group unknown	restart the system
ReplayCtrlInterface::vRunAcquisition failed, selected movie group unknown	restart the system
ReplayCtrlInterface::vSetForAllRepMngrsParams failed, selected movie group unknown	restart the system
RepresentationManager returned NULL write position	restart the system
RepresentationManager: NextChunkGenerated failed, number bytes written!=UnitSize	restart the system
RepresentationManager::addListener called within Transaction!!	restart the system
RepresentationManager::Destructor caused exception, Open Transaction!!	restart the system
RepresentationManager::pActualUnitWrtAddr called within Transaction!!	restart the system
RepresentationManager::pNextUnitsCompleted called within Transaction!!	restart the system
RepresentationManager::removeAllListener called within Transaction!!	restart the system
RepresentationManager::removeListener called within Transaction!!	restart the system
RepresentationManager::vClear called within Transaction!!	restart the system
RepresentationManager::vCreate: Nr. Dim 0 incorrect, see vSetReplayParams() call	restart the system
RepresentationManager::vCreate: Nr. Dim 1 incorrect, see vSetReplayParams() call	restart the system

Error Messages	Actions
RepresentationManager::vCreate: Nr. Dim 2 incorrect, see vSetReplayParams() call	restart the system
RepresentationManager::vResizeBufferLength called within Transaction!!	restart the system
RepresentationManager::vResizeBufferLength caused exception, replay buffer is not empty!!	restart the system
RepresentationManager::vSetGeoDescription called within Transaction!!	restart the system
RepresentationManager::vSetReplayParams called within Transaction!!	restart the system
Restore error (Error while reading backup data.)	Backup data are probably damaged. Try again or load another backup.
RiseSmooth Out Of Range	press ok and save this user-setting once again
RT_4DTissueFilterBlock::bDllLineFilter call failed!!	restart the system
RT_4DTissueFilterBlock::bDllLineFrameFilter call failed!!	restart the system
RT_4DTissueFilterBlock::execute DMA Block size and calculated frame size differs!!	restart the system
RT_4DTissueFilterBlock::execute replay buffer write adress is NULL!!	restart the system
RT_4DTissueFilterBlock:: Storage Error, no dynamic memory for filter operations available!!	restart the system
RT_4DTissueFilterBlock:: storage needed for one filtered volume differs from available Unitsize within replay buffer!!	restart the system
RT_4DTissueFilterBlock::vCheckCahngedInports Replay buffer not cleared before VolGeoChange!!	restart the system
RT_ColorFlowFilterBlock Constructor: Memory allocation failed	restart the system
RT_ColorFlowFilterBlock::vCheckIQDataSizeAndUpdateTables: Memory allocation failed	restart the system
RT_ColorFlowFilterBlock::vDebugDrawIQDataCurve: Memory allocation failed	restart the system
RT_ConnectionMngr::vAssembleRTSet: no RT_TissueFilterBlock found for TISSUE3D Blocks	restart the system
RT_ECG_Block::bStart ECGInterface failed!!	restart the system
RT_MColorFilterBlock::RT_MColorFilterBlock: Memory allocation failed	restart the system
RT_MColorFilterBlock::vCheckIQDataSizeAndUpdateBuffer: Memory allocation failed	restart the system
RT_MColorFilterBlock::vDebugDrawIQDataCurve: Memory allocation failed	restart the system

Error Messages	Actions
RT_MotionMBlock::execute caused exception:: Addr from DMA= xx, ReplayBuffAddr= xx, (Line+Header)Size= xx, blockLength= xx, value i= xx!!	restart the system
RT_PWorCW_Block::replay buffer size smaller than expected	restart the system
RT_PWorCW_Block::execute caused exception:: Addr from DMA= xx, ReplayBuffAddr= xx, (Line+Header)Size= xx, blockLength= xx, line index= xx!!	restart the system
RT_PWorCW_Block::execute: Error, length of DMA block 1[xx] is not aligned to linesize!!	restart the system
RT_PWorCWFilterBlock::execute : replay buffer size smaller than expected	restart the system
RT_PWorCWFilterBlock::execute caused exception:: Addr from DMA=xx, ReplayBuffAddr=xx, (Line+Header) Size=xx, blockLength=xx, line index=xx!!	restart the system
RT_PWorCWFilterBlock::execute::first sequence description of sequence description vector is accepted to be PW shot sequence!!	restart the system
RT_PWorCWFilterBlock::RT_PWorCWFilterBlock():: iPWCW_InitializeProcessing returned error code xx !!	restart the system
RT_RFProcessBlockTissue Constructor: memory allocation failed	restart the system
RT_RFProcessingBlock::pGetAdjustedInputBuffer: memory allocation failed	restart the system
RT_RFProcessingBlock::vDisplayRFSpectrum: memory allocation failed	restart the system
RT_RFProcessingBlockColor::vCheckIQDataSizeAndUpdateTables: memory allocation failed	restart the system
RT_RFProcessingBlockColor::vCheckRFDataSizeAndUpdateBuffers: memory allocation failed	restart the system
RT_RFProcessingBlockTissue::vCheckRFDataSizeAndUpdateBuffers: memory allocation failed	restart the system
RT-TissueFilter DLL call failed	restart the system
SamplePRF too big	restart the system
SRI : filter creation failed	restart the system
Start Bandwidth too small	restart the system
Start ET too small	restart the system
Start frequency too small	restart the system
Storage Pool creation failed	restart the system
StoragePool: Not sufficient replay storage for B & CF Mode available	restart the system
StoragePool: Not sufficient replay storage for ECG available	restart the system

Error Messages	Actions
StoragePool: Not sufficient replay storage for M Mode available	restart the system
StoragePool: Not sufficient replay storage for MC or PW Mode available	restart the system
System detected severe error. Some components like Touch Panel server may not be registered. Please register Touch Panel server and restart.	restart the system, call technical support
The 3D_UserPrograms Database is Currupted, All the data will be lost, Please load it from Backup	restart the system
The Database UserPrograms Corrupted	restart the system
The Date format not stored properly	close registry, restart the system and try again
The Handle Unregistered	close registry, restart the system and try again
The Registry not closed	restart the system
The System detected a problem with your harddisk. Please do not reboot or shut down the machine! Please contact your service department as soon as possible.	if possible, • save “Full Backup” (see: Section 4-5-3 on page 4-32) to “DVD/CD”, “Network”, or “Other drive” (including images) • if not currently done, save all images via Sonoview (see: Section 4-5-6 on page 4-37) , • call technical support
Thickness mismatch xx - GIP xx	restart 3D (go to 2D); restart the system
UI_BBC_ArchiveWnd::vSet() has an wrong ImageType	restart the system
UI_BBC_ArchiveWnd::vSet() will change from eB_Wnd to wrong ImageType	restart the system
UI_BBC_ArchiveWnd::vSet() will change from eBBC_Wnd to wrong ImageType	restart the system
UI_BBC_Wnd::vSet() has an wrong ImageType	restart the system
UI_BBC_Wnd::vSet() will change from eB_Wnd to wrong ImageType	restart the system
UI_BBC_Wnd::vSet() will change from eBBC_Wnd to wrong ImageType	restart the system
UI_Manager: failed to create BBC Wnd	restart the system
UI_Manager::vDestroyWnd: dynamic cast to UI_MMC_Wnd* failed	restart the system
UI_Manager::vDestroyWnd: dynamic cast to UI_PW_Wnd* failed	restart the system
UI_Manager::vHRS_Execute multiple call	restart the system
UIS String is bad NLS key: <%s> Keys must not start/end with whitespaces	repeat the activity
undefined CW ADC_Clk-Teiler	restart the system
Unknown C++ exception	restart the system
Unknown Error	load volume files from other storage medium

Error Messages	Actions
Unknown system exception	restart the system
unknown Xilinx-Version	restart the system
unrecordable disc or disc is closed	try again with another disk
Unsupported color mode	restart the system
Verify error (Error while checking backup data.)	Backup data are probably damaged. Try again or load another backup.
ViewerConMngr::vAssembleCF_DFE: attempt to get ECG_Consumer_2D- or ECG_Draw_2D-Block from ECGViewer Objects failed!!	restart the system
ViewerConMngr::vAssembleM_DFE: attempt to get ECG_Consumer_2D- or ECG_Draw_2D-Block or ECG-CalcHR-Block from ECGViewer Objects failed!!	restart the system
ViewerConMngr::vAssembleTissueDFE : attempt to get ECG_Consumer_2D- or ECG_Draw_2D-Block from ECGViewer Objects failed!!	restart the system
Volume_dB Out Of Range	press ok and save this user-setting once again
WMF_KoefBlock: SamplePRF too big	restart the system
Write error!	use a new CDR
Wrong disc type! Please enter a data disc and try again.	restart the system

Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter contains replacement procedures for different modules and their subsystems.

NOTICE The **Manpower**, time and **Tools** indicated in the Sub-sections include all requirements from **Preparations** to **Installation Procedures**.

WARNING ***No covers or panels should be removed from the system (high-voltage risk).***
Service and repairs must only be performed by authorized personal.
Attempting do-it-yourself repairs invalidate warranty and are an infringement to regulations and are inadmissible acc. to IEC 60601-1.

NOTICE The appropriate functional tests of the system (as described in Chapter 4) have to be performed after replacement procedures.

The Waste of Electrical and Electronic Equipment (WEEE) must not be disposed as unsorted municipal waste and must be collected separately.
Please contact the manufacturer or other authorized disposal company for information concerning the decommission of your equipment.

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8-1-2 Returning/Shipping System, Probes and Repair Parts

Equipment being returned must be clean and free of blood and other infectious substances.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstance should a part or equipment with visible body fluids be taken or shipped from a clinic or site (for example, body coils or an ultrasound probe).

The purpose of the regulation is to protect employees in the transportation industry, as well as the people who will receive or open this package.

NOTE: The US Department of Transportation (DOT) has ruled that “items what were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care” are “regulated medical waste” for transportation purpose and must be transported as a hazardous material.

Section 8-2
System Software - Installation/Upgrade Procedure

8-2-1 FMI from DVD

8-2-1-1 Introduction

⚠ **NOTICE** To update the Systems C:\ image via the FMI FROM DVD button in the System Setup **SERVICE** page, see: Section 8-2-1-5 "System Software - Installation Procedure (FMI from DVD)" on page 8-7.
The Software parts to be upgraded (e.g., Ultrasound Application Software, Service Software, EUM, MS Patches, etc.) depend on the contents of the System DVD being used.

⚠ **NOTICE** f the currently installed software has to be upgraded to a newer version, and the system DVD being used is **SW 8.2.0 or higher**, a new software specific “Permanent key” is required. (Calculated in OKOS Option Key Order System; http://3.187.187.9/OKOS.
If you do not have permission to access OKOS, contact the **O**n **L**ine **C**enter to get the necessary key.

8-2-1-2 Manpower

One person ~ 1 hour (depends on contents of System DVD, peripherals, etc.)

8-2-1-3 Tools

System DVD

8-2-1-4 Preparations

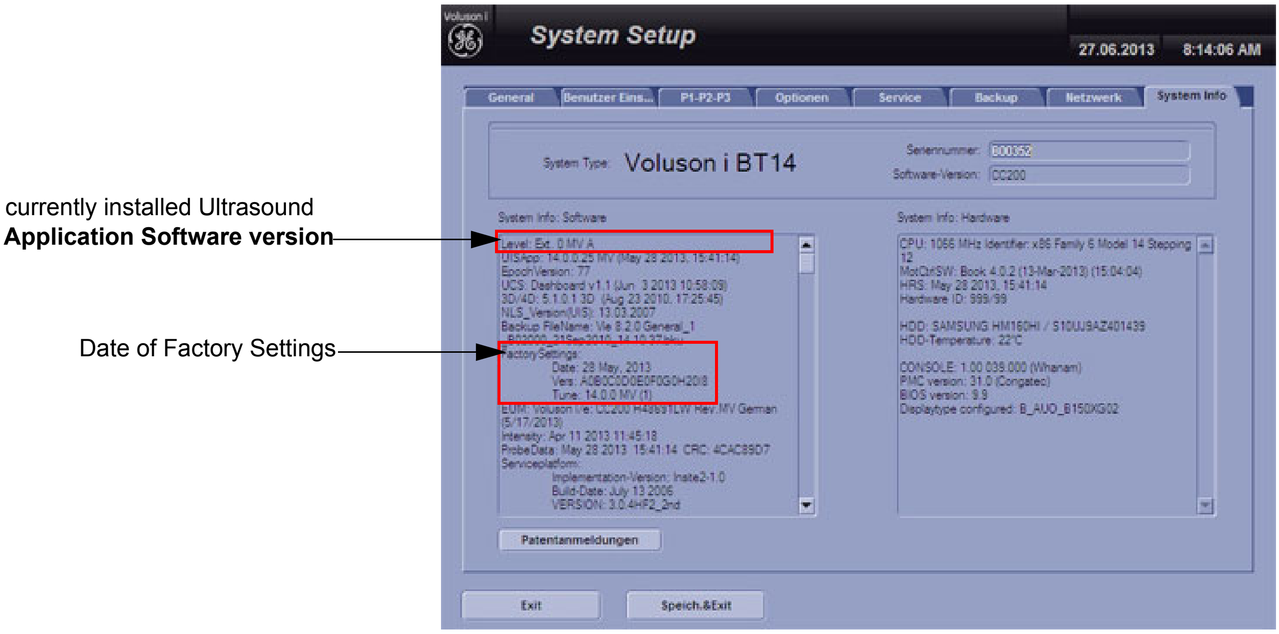
Before performing the Software Update/Upgrade:

A.) make sure that all system functions are working correct
B.) check the current Ultrasound Application Software version and the installed Options
C.) if the currently installed software has to be upgraded to a newer version, and the system DVD being used is SW 8.2.0 or higher, calculate new software specific “Permanent key” in OKOS.

*NOTE: It is **NOT necessary** to save Full System Configuration (Full Backup) prior to the upgrade.*
All existing User Programs, 3D/4D Programs and Auto Text settings remain untouched!

8-2-1-4 **Preparations** (cont'd)

1.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.
2.) Select the SYSTEM item from the Utilities menu - which is displayed on the left side of the screen.
3.) Select the SYSTEM INFO page on the System Setup desktop screen to see which Software/Hardware version is installed in the unit.



currently installed Ultrasound
Application Software version

Date of Factory Settings

System Type: Voluson i BT14
Seriennummer: 000352
Software-Version: CC200

System Info: Software

```
Level: Ext. 0 MV A
UISApp: 14.0.0.25 MV (May 28 2013, 15:41:14)
EpochVersion: 77
UCS: Dashboard v1.1 (Jun  3 2013 10:58:09)
3D/4D: 5.1.0.1 3D  (Aug 23 2010, 17:25:45)
NLS_Version(UIS): 13.03.2007
Backup FileName: Vie 8.2.0 General_1
_B03000_31Sep2010_14.10.37.bku
FactorySettings:
          Date: 28 May, 2013
          Vers: A0B0C0D0E0F0G0H2018
          Tune: 14.0.0 MV (1)
EUM: Voluson i/e: CC200 H48691LW Rev.MV German
(5/17/2013)
Intensity: Apr 11 2013 11:45:18
ProbeData: May 28 2013  15:41:14  CRC: 4CAC89D7
Serviceplatform:
          Implementation-Version: Insite2-1.0
          Build-Date: July 13 2006
          VERSION: 3.0.4HF2_2nd
```

System Info: Hardware

```
CPU: 1066 MHz Identifier: x86 Family 6 Model 14 Stepping
12
MotCtrlSW: Book 4.0.2 (13-Mar-2013) (15:04:04)
HRS: May 28 2013, 15:41:14
Hardware ID: 999/99

HDD: SAMSUNG HM160HI / S10UJ9AZ401439
HDD-Temperature: 22°C

CONSOLE: 1.00 039.000 (Whanam)
PMC version: 31.0 (Congatec)
BIOS version: 9.9
Displaytype configured: B_AUO_B150XG02
```

Figure 8-1 Version check

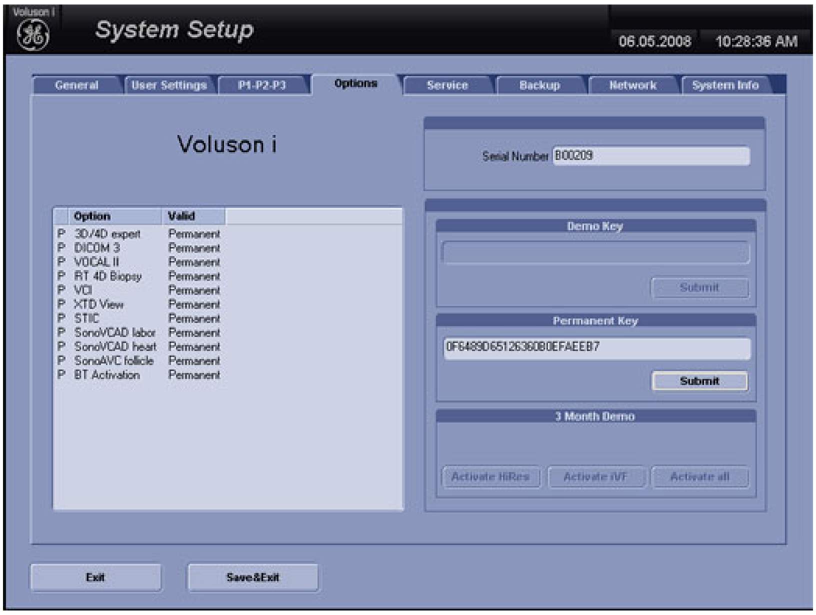
8-2-1-4 Preparations (cont'd)

4.) Select the OPTION page on the System Setup desktop screen to see which Options are installed.

D = Demo
(Option is activated for demo and expires on the date shown in the "Valid" column)

I = Inactive
(Option is not activated)

P = Permanent
(Option is permanently activated [purchased])


Voluson i
System Setup
06.05.2008
10:28:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Voluson i
Demo Key
Submit
3 Month Demo
Activate HiRes
Activate iVF
Activate all
Exit
Save&Exit

Serial Number B00209

	Option	Valid
P	3D/4D expert	Permanent
P	DICOM 3	Permanent
P	VOCAL II	Permanent
P	RT 4D Biopsy	Permanent
P	VCI	Permanent
P	XTD View	Permanent
P	STIC	Permanent
P	SonoVCAD labor	Permanent
P	SonoVCAD heart	Permanent
P	SonoAVC follicle	Permanent
P	BT Activation	Permanent

Permanent Key
0F6489D65126360B0EFAEEB7
Submit

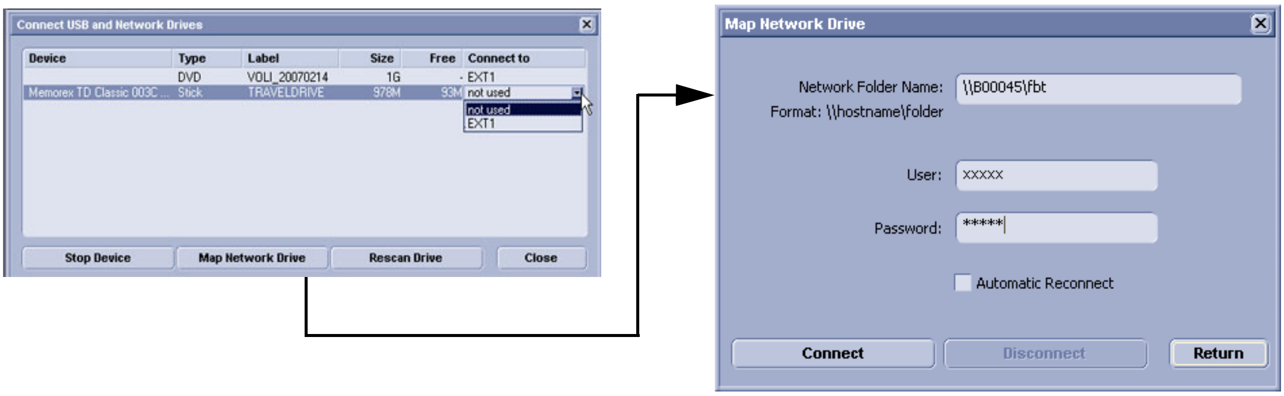
Figure 8-2 Option page (e.g., Voluson i)

NOTICE Please print out the OPTION page or write down the "Permanent Key"!
If the currently installed software has to be upgraded to a newer version, and the system DVD being used is **SW 8.2.0 or higher**, a new software specific "Permanent key" is required. (Calculated in OKOS Option Key Order System; http://3.187.187.9/OKOS.)

If currently installed Application Software version is below 7.0.0:

1.) Press the USB button on the keyboard.

2.) In the displayed “Connect USB and Network Drives” window, select the MAP NETWORK DRIVE button to open the dialog.



Connect USB and Network Drives

Device	Type	Label	Size	Free	Connect to
	DVD	VOLI_20070214	1G	-	EXT1
Memorex TD Classic 003C ...	Stick	TRAVELDRIVE	978M	93M	not used

Map Network Drive

Network Folder Name: \\B00045\fbt
Format: \\hostname\folder

User: xxxxx

Password: *****

☐ Automatic Reconnect

Figure 8-3 Map Network Drive setting

NOTICE Please print out the “Map Network Drive” dialog page, or write down all its information.

NOTE: For detailed description refer to Section 3-12-3 "Map Network Drive" on page 3-118.

8-2-1-5 System Software - Installation Procedure (FMI from DVD)

The system software installation procedure starts with saving and recording the settings present on the system (silent “Rollback”). Then the new software is written to the hard disk using the System DVD. Application Settings are automatically updated, to match with new Software version.

Existing User Programs, 3D/4D Programs and Auto Text remain unaffected! Afterwards the new software is configured such that it is integrated again in its environment.

⚠ **CAUTION** **Disconnecting ALL external USB devices** (**except DVD/CD+(R)W drive) is NECESSARY.**

Re-installation of any previously attached printer has to be done after the upgrade procedure.

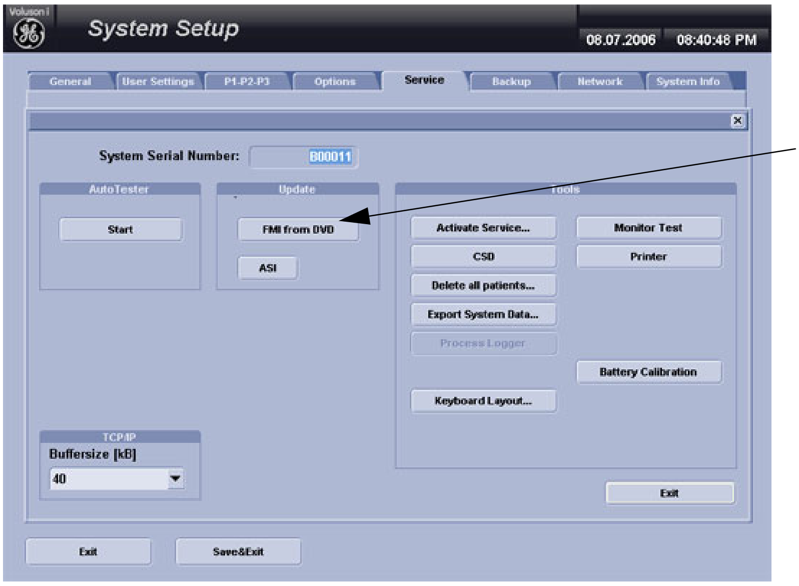
Note: Installing the Bluetooth Printer and its connection set is not possible by the user.

NOTE: For more detailed information about “FMI from DVD” refer to Section 5-13-2-2-1 on page 5-54.

1.) Perform Preparations as described in Section 8-2-1-4 on page 8-3.
2.) If not already done, disconnect all external USB devices (**except** DVD/CD+(R)W drive).
3.) Insert the System DVD into the drive.
4.) **Restart** the system. (Turn system OFF and then back ON)

⚠ **NOTICE** If the system boots into LINUX, the “Boot priority order” in BIOS is **incorrect**.
In this case, cancel the software installation procedure (select Exit/Reboot by means of the [Arrow] keys (right, left, up, down) and the [Enter] key on the keyboard) and then contact your service representative.

5.) After system restart, press the **UTILITIES** key on the alphanumeric keyboard.
6.) Select the SYSTEM item from the Utilities menu on the left side of the screen.
7.) Select the **SERVICE** page.
8.) Type in the password SHE and click ACCEPT.


Voluson i
System Setup
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
AutoTester
Start
Update
FMI from DVD
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Exit
Exit
Save&Exit

08.07.2006 08:40:48 PM

System Serial Number: B00011

Buffersize [kB] 40

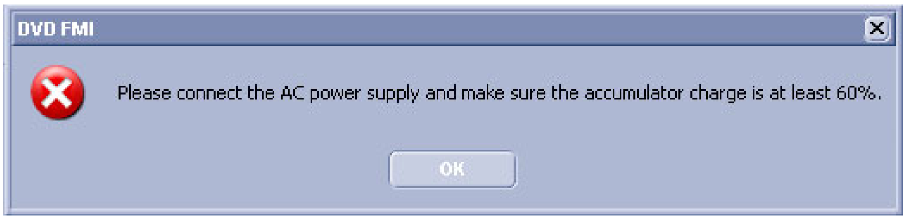
[FMI from DVD] button

Figure 8-4 Service Tools

⚠ **NOTICE** Please verify that you have recorded the **Permanent key** (see: Figure 8-2 on page 8-5).

9.) Click on the FMI FROM DVD button for updating the System Software.

8-2-1-5 System Software - Installation Procedure (FMI from DVD) (cont'd)



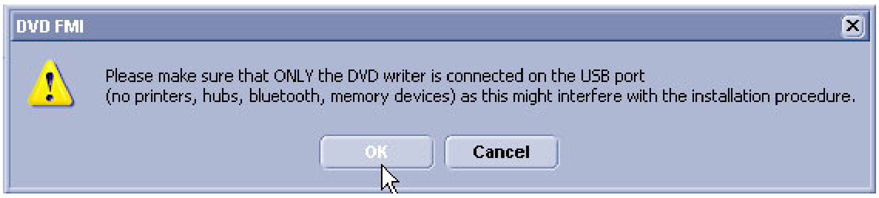
Please connect the AC power supply and make sure the accumulator charge is at least 60%.

Figure 8-5 battery less charged or Power supply is disconnected

In this case, connect the Power supply to charge the battery, afterwards try again.

*NOTE: To check capacity of the battery, move the cursor over the **Battery Icon** in the status area (see: Figure 5-11 on page 5-31).*

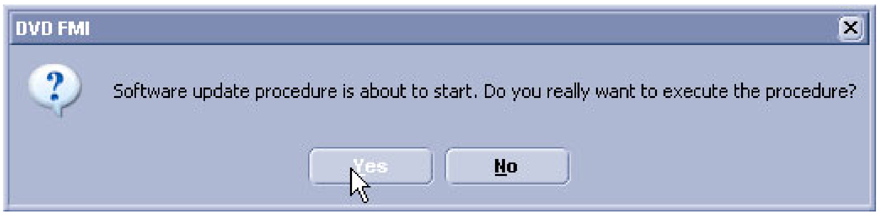
10.) Verify that only the DVD drive is connected to the system, then click OK (Figure 8-6 below).



Please make sure that ONLY the DVD writer is connected on the USB port
(no printers, hubs, bluetooth, memory devices) as this might interfere with the installation procedure.

Figure 8-6 Verify that USB devices are disconnected, then click OK

11.) To start update procedure click YES (Figure 8-7 below).



Software update procedure is about to start. Do you really want to execute the procedure?

Figure 8-7 Yes - start update procedure

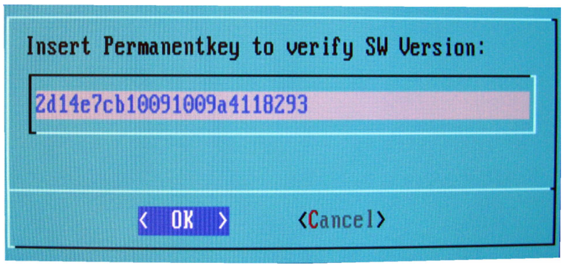
12.) The system saves Full Backup in silent mode on R:, then it reboots into LINUX.

13.) A silent “Rollback” image from C:\ is stored on R:\.
After executing all LINUX commands, the system reboots again.

8-2-1-5 System Software - Installation Procedure (FMI from DVD) (cont'd)

NOTE: *If the currently installed software has to be upgraded to a newer version, and the system DVD being used is **SW 8.2.0 or higher**, a new software specific "Permanent key is required.*

- Enter the appropriate "Permanent Key" (calculated in OKOS; http://3.187.187.9/OKOS), select OK and confirm with **ENTER**.



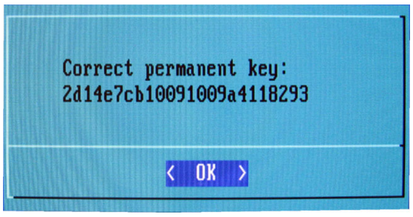
Insert Permanentkey to verify SW Version:

2d14e7cb10091009a4118293

Note: This Example shows fictional numbers.

Figure 8-8 insert Permanent Key

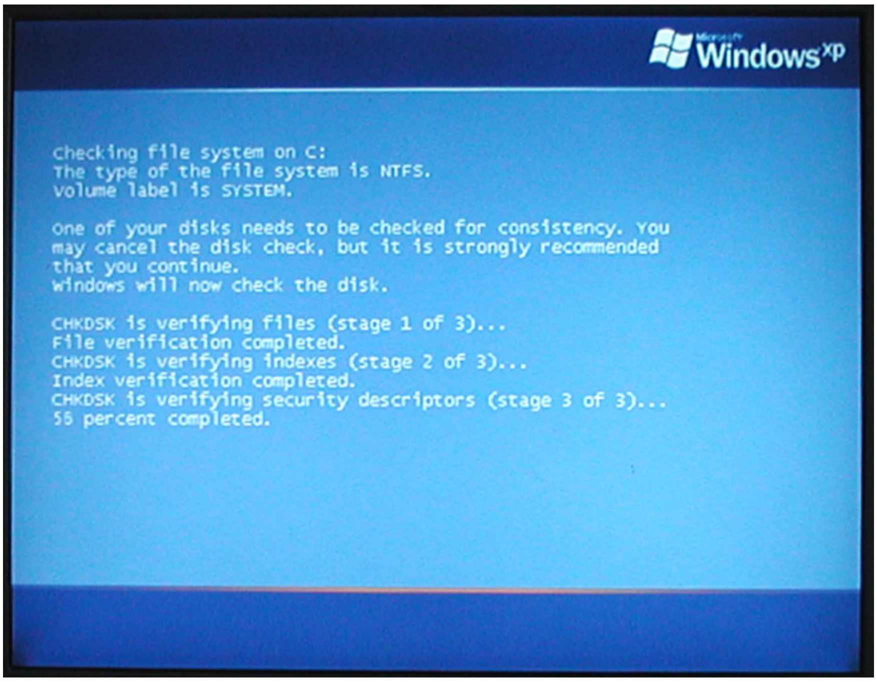
- If the entered Permanent key is correct, following window appears, confirm with **ENTER**.



Correct permanent key:
2d14e7cb10091009a4118293

Figure 8-9 confirm Permanent Key

14.)Check disk is performed automatically - restart.



```
Checking file system on C:
The type of the file system is NTFS.
Volume label is SYSTEM.

One of your disks needs to be checked for consistency. You
may cancel the disk check, but it is strongly recommended
that you continue.
Windows will now check the disk.

CHKDSK is verifying files (stage 1 of 3)...
File verification completed.
CHKDSK is verifying indexes (stage 2 of 3)...
Index verification completed.
CHKDSK is verifying security descriptors (stage 3 of 3)...
55 percent completed.
```

Figure 8-10 Check disk is performed automatically

8-2-1-5 System Software - Installation Procedure (FMI from DVD) (cont'd)

15.) 3 dots (one after the other) appear on the screen (see: Figure 8-11 below).

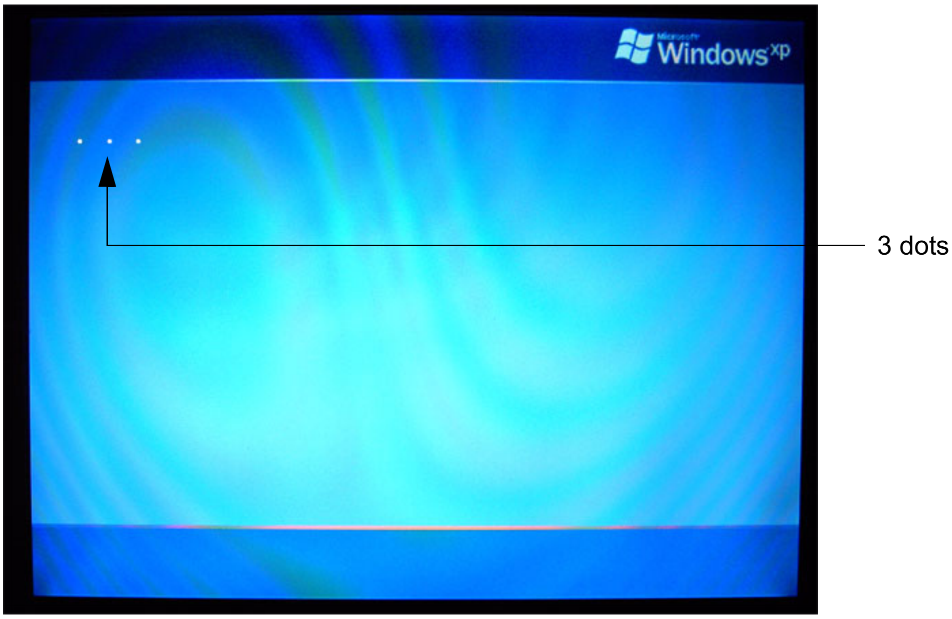

Windows XP
3 dots

Figure 8-11 3 dots appear on the screen

16.) Booting **auto**.....

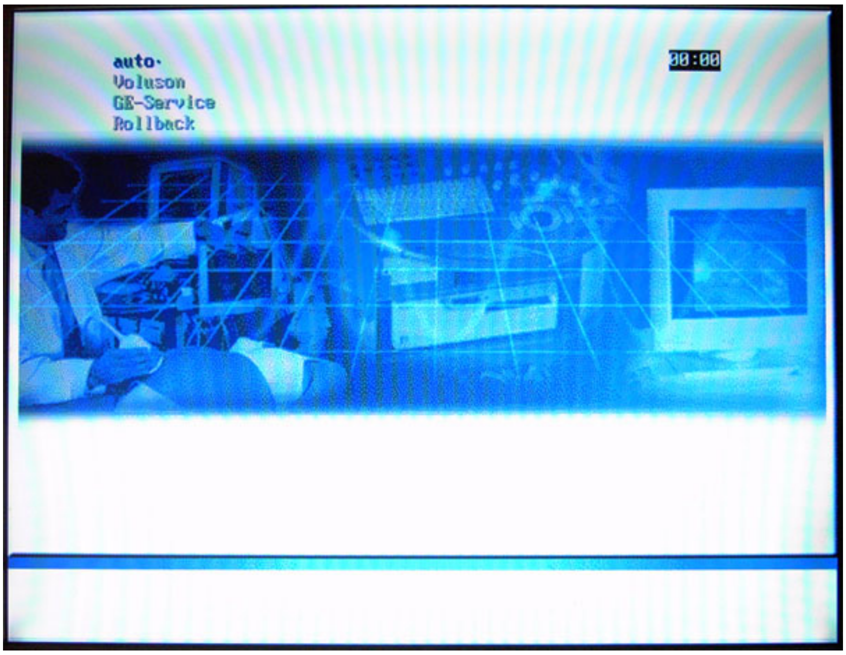
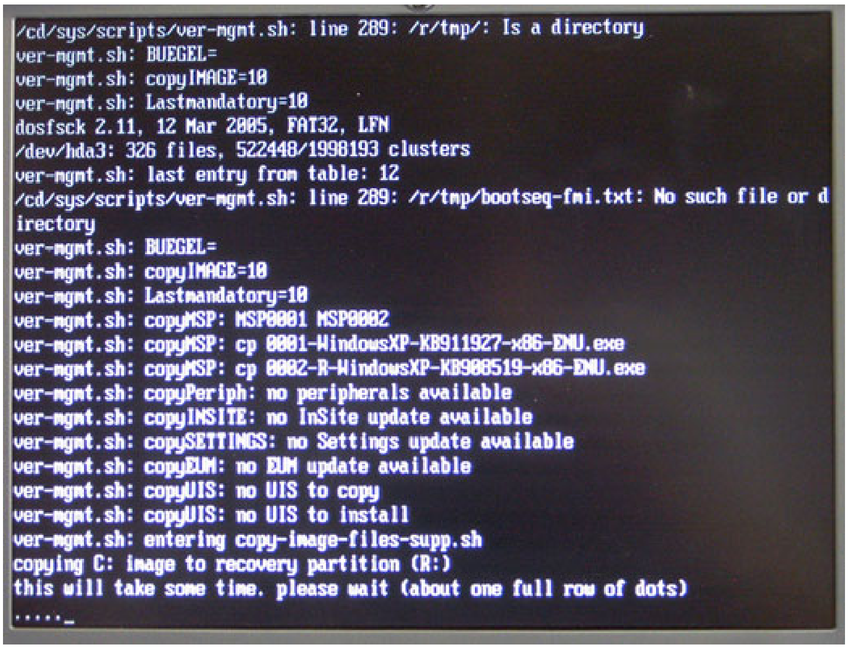

auto
Voluson
GE-Service
Rollback
00:00

Figure 8-12 Boot screen - auto

8-2-1-5 System Software - Installation Procedure (FMI from DVD) (cont'd)

17.)Updating will take some time......

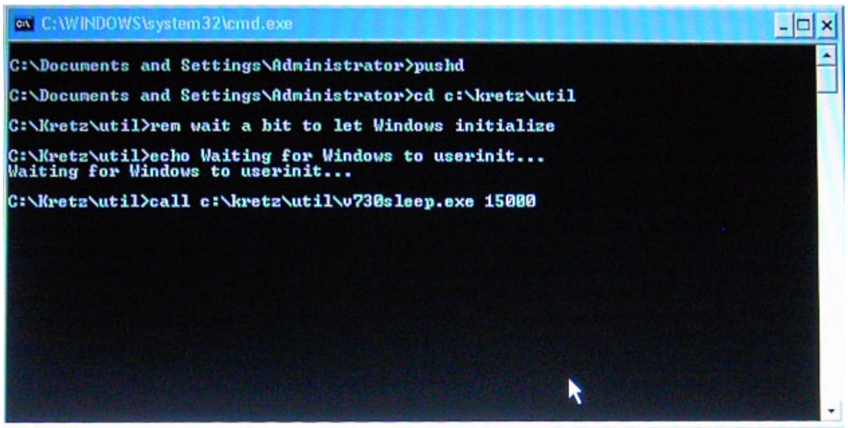


```
/cd/sys/scripts/ver-mgmt.sh: line 289: /r/tmp/: Is a directory
ver-mgmt.sh: BUEGEL=
ver-mgmt.sh: copyIMAGE=10
ver-mgmt.sh: Lastmandatory=10
dosfsck 2.11, 12 Mar 2005, FAT32, LFN
/dev/hda3: 326 files, 522448/1998193 clusters
ver-mgmt.sh: last entry from table: 12
/cd/sys/scripts/ver-mgmt.sh: line 289: /r/tmp/bootseq-fmi.txt: No such file or d
irectory
ver-mgmt.sh: BUEGEL=
ver-mgmt.sh: copyIMAGE=10
ver-mgmt.sh: Lastmandatory=10
ver-mgmt.sh: copyMSP: MSP0001 MSP0002
ver-mgmt.sh: copyMSP: cp 0001-WindowsXP-KB911927-x86-ENU.exe
ver-mgmt.sh: copyMSP: cp 0002-R-WindowsXP-KB908519-x86-ENU.exe
ver-mgmt.sh: copyPeriph: no peripherals available
ver-mgmt.sh: copyINSITE: no InSite update available
ver-mgmt.sh: copySETTINGS: no Settings update available
ver-mgmt.sh: copyEUM: no EUM update available
ver-mgmt.sh: copyUIS: no UIS to copy
ver-mgmt.sh: copyUIS: no UIS to install
ver-mgmt.sh: entering copy-image-files-supp.sh
copying C: image to recovery partition (R:)
this will take some time. please wait (about one full row of dots)
....._
```

Figure 8-13 Please wait....

18.)Please wait until all processes are finished (100 percent completed).

19.)The system is rebooting into windows (Boot screen - **Voluson**).



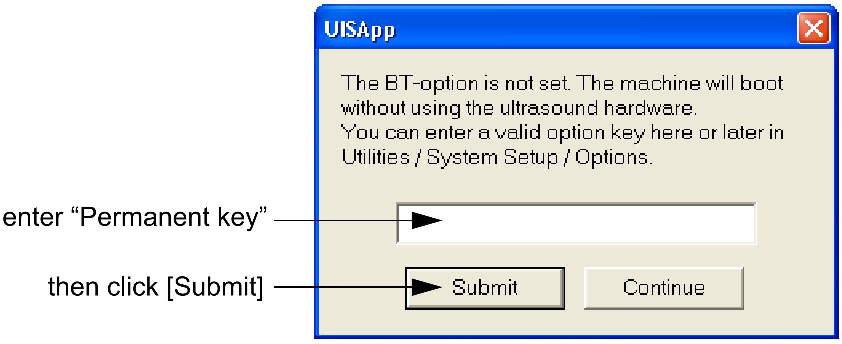
```
C:\Documents and Settings\Administrator>pushd

C:\Documents and Settings\Administrator>cd c:\kretz\util

C:\Kretz\util>rem wait a bit to let Windows initialize

C:\Kretz\util>echo Waiting for Windows to userinit...
Waiting for Windows to userinit...

C:\Kretz\util>call c:\kretz\util\v730sleep.exe 15000
```

Figure 8-14 automatic processes are running

20.)Please wait until all processes are finished. Finally the 2D screen is displayed on the monitor.

8-2-1-5 System Software - Installation Procedure (FMI from DVD) (cont'd)

NOTE: *If the BT warning dialog (Figure 8-15 below) appears, enter the Permanent key previously recorded (refer to Figure 8-2: Option page (e.g., Voluson i) on page 8-5) and then click SUBMIT.*



UISApp

The BT-option is not set. The machine will boot without using the ultrasound hardware.
You can enter a valid option key here or later in Utilities / System Setup / Options.

Figure 8-15 Enter Permanent key

21.) Remove the System DVD from the DVD/CD+(R)W Drive drive.

22.) **Reconnect the external devices**, install all the printers and adjust the printer settings as described in Section 3-7 "Printer Installation" on page 3-80.

23.) Check and match system settings in the P1-P2-P3 page´s [Print], [Save] and [Export] tab.

24.) Confirm that the date and time are set correctly and that the Windows automatic DST feature is off. Refer to Section Section 6-10 "Daylight Saving Time (DST) - New Dates" on page 6-12.

25.) In case that Application software was below SW 7.0.0 (prior to system upgrade), check and match Network drive settings (see: Figure 8-3 on page 8-6) according to the printout.

8-2-2 FMI from external device (available at Software 8.x.x)

8-2-2-1 Introduction

NOTICE To update the Systems C:\ image via the FMI FROM EXTERNAL DEVICE button in the System Setup **SERVICE** page,see: Section 8-2-2-5 "System Software - Installation Procedure (FMI from external device)" on page 8-16.
The Software parts to be upgraded (e.g., Ultrasound Application Software, Service Software, EUM, MS Patches, etc.) depend on the contents of the USB System Stick being used.

NOTICE f the currently installed software has to be upgraded to a newer version, and the system DVD being used is **SW 8.2.0 or higher**, a new software specific “Permanent key” is required. (Calculated in OKOS Option Key Order System; http://3.187.187.9/OKOS.
If you do not have permission to access OKOS, contact the **O**n **L**ine **C**enter to get the necessary key.

8-2-2-2 Manpower

One person ~ 1 hour (depends on contents of USB System Stick, peripherals, etc.)

8-2-2-3 Tools

USB System Stick

8-2-2-4 Preparations

Before performing the Software Update/Upgrade:

A.) make sure that all system functions are working correct
B.) check the current Ultrasound Application Software version and the installed Options

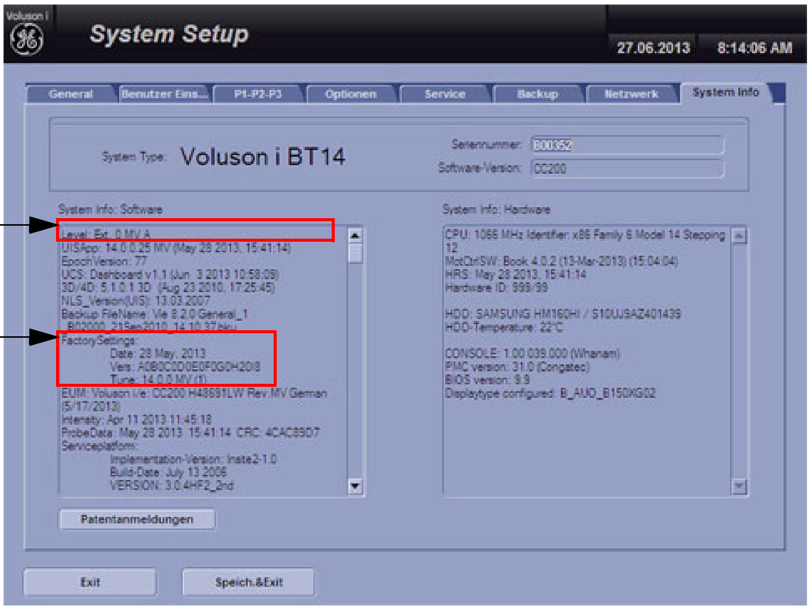
*NOTE: It is **NOT necessary** to save Full System Configuration (Full Backup) prior to the upgrade.
All existing User Programs, 3D/4D Programs and Auto Text settings remain untouched!*

8-2-2-4 Preparations (cont'd)

1.) Press the **UTILITIES** key on the keyboard once to display the Utilities menu.
2.) Select the SYSTEM item from the Utilities menu - which is displayed on the left side of the screen.
3.) Select the SYSTEM INFO page on the System Setup desktop screen to see which Software/Hardware version is installed in the unit.

currently installed Ultrasound
Application Software version

Date of Factory Settings



System Type: Voluson i BT14
Seriennummer: B00352
Software-Version: CC200

System Info: Software

Level: Ext. 0 MV A
UISApp: 14.0.0.25 MV (May 28 2013, 15:41:14)
EpochVersion: 77
UCS: Dashboard v1.1 (Jun 3 2013 10:58:09)
3D/4D: 5.1.0.1 3D (Aug 23 2010, 17:25:45)
NLS_Version(UIS): 13.03.2007
Backup FileName: Vie 8.2.0 General_1 _B02000_21Sep2010_14.10.37.bku
FactorySettings:
Date: 28 May, 2013
Vers: A0B0C0D0E0F0G0H2018
Tune: 14.0.0 MV (1)
EUM: Voluson i/e: CC200 H48691LW Rev.MV German (5/17/2013)
Intensity: Apr 11 2013 11:45:18
ProbeData: May 28 2013 15:41:14 CRC: 4CAC89D7
Serviceplatform:
Implementation-Version: Insite2-1.0
Build-Date: July 13 2006
VERSION: 3.0.4HF2_2nd

System Info: Hardware

CPU: 1066 MHz Identifier: x86 Family 6 Model 14 Stepping 12
MotCtrlSW: Book 4.0.2 (13-Mar-2013) (15:04:04)
HRS: May 28 2013, 15:41:14
Hardware ID: 999/99

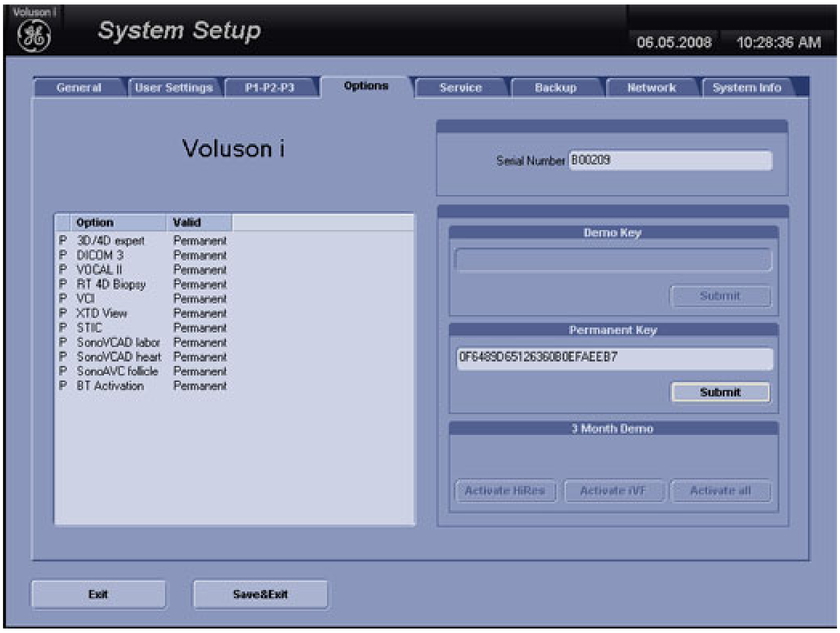
HDD: SAMSUNG HM160HI / S10UJ9AZ401439
HDD-Temperature: 22°C

CONSOLE: 1.00.039.000 (Whanam)
PMC version: 31.0 (Congatec)
BIOS version: 9.9
Displaytype configured: B_AUO_B150XG02

Figure 8-16 Version check

8-2-2-4 Preparations (cont'd)

4.) Select the OPTION page on the System Setup desktop screen to see which Options are installed.


Voluson i
System Setup
06.05.2008
10:28:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Voluson i
Demo Key
Submit
Permanent Key
Submit
3 Month Demo
Activate HiRes
Activate iVF
Activate all
Exit
Save&Exit

Serial Number B00209

	Option	Valid
P	3D/4D expert	Permanent
P	DICOM 3	Permanent
P	VOCAL II	Permanent
P	RT 4D Biopsy	Permanent
P	VCI	Permanent
P	XTD View	Permanent
P	STIC	Permanent
P	SonoVCAD labor	Permanent
P	SonoVCAD heart	Permanent
P	SonoAVC follicle	Permanent
P	BT Activation	Permanent

Permanent Key: 0F6489D65126360B0EFAEEB7

D = Demo
(Option is activated for demo and expires on the date shown in the "Valid" column)

I = Inactive
(Option is not activated)

P = Permanent
(Option is permanently activated [purchased])

Figure 8-17 Option page (e.g., Voluson i)

⚠ **NOTICE** Please print out the OPTION page or write down the "Permanent Key"!

8-2-2-5 System Software - Installation Procedure (FMI from external device)

The system software installation procedure starts with saving and recording the settings present on the system (silent “Rollback”). Then the new software is written to the hard disk using the Stick. Application Settings are automatically updated, to match with new Software version.

Existing User Programs, 3D/4D Programs and Auto Text remain unaffected! Afterwards the new software is configured such that it is integrated again in its environment.

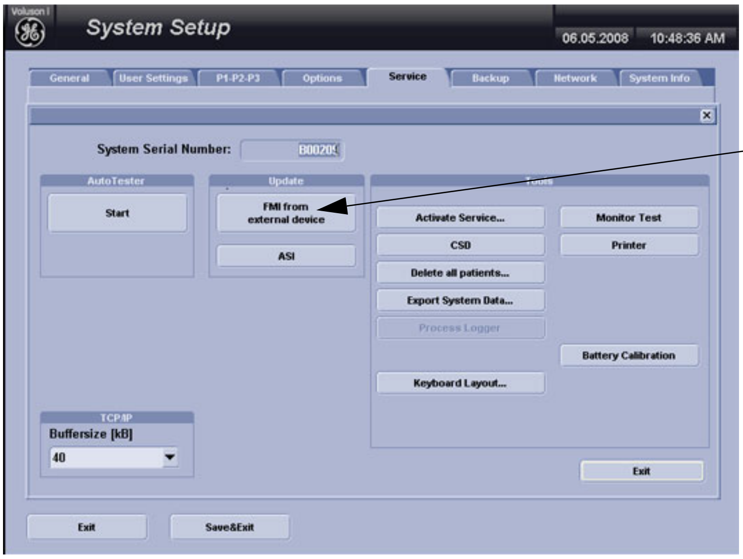
⚠ **CAUTION** **Disconnecting ALL external USB devices is NECESSARY** (also the DVD-Drive).
Re-installation of any previously attached printer has to be done after the upgrade procedure.
Note: Installing the Bluetooth Printer and its connection set is not possible by the user.

NOTE: For more information about “FMI from external device” refer to Section 5-13-2-2-2 on page 5-54.

1.) Perform Preparations as described in Section 8-2-2-4 on page 8-13.
2.) If not already done, disconnect all external USB devices.
3.) Insert the Stick into the USB port on the rear of the system.
4.) **Restart** the system. (Turn system OFF and then back ON)

⚠ **NOTICE** If the system boots into LINUX, the “Boot priority order” in BIOS is **incorrect**.
In this case, cancel the software installation procedure (select Exit/Reboot by means of the [Arrow] keys (right, left, up, down) and the [Enter] key on the keyboard) and then contact your service representative.

5.) After system restart, press the **UTILITIES** key on the alphanumeric keyboard.
6.) Select the SYSTEM item from the Utilities menu on the left side of the screen.
7.) Select the **SERVICE** page.
8.) Type in the password SHE and click ACCEPT.


Voluson i
System Setup
06.05.2008
10:48:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
System Serial Number:
B0020
AutoTester
Start
Update
FMI from external device
ASI
Tools
Activate Service...
CSD
Delete all patients...
Export System Data...
Process Logger
Keyboard Layout...
Monitor Test
Printer
Battery Calibration
TCP/IP
Buffersize [kB]
40
Exit
Exit
Save&Exit

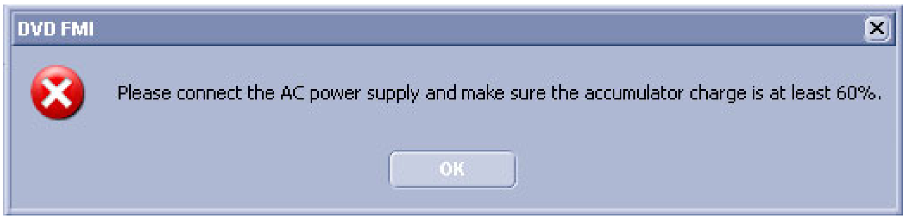
[FMI from external device] button

Figure 8-18 Service Tools

⚠ **NOTICE** Please verify that you have recorded the **Permanent key** (see: Figure 8-17 on page 8-15).

9.) Click on the FMI FROM EXTERNAL DEVICE button for updating the System Software.

8-2-2-5 System Software - Installation Procedure (FMI from external device) (cont'd)



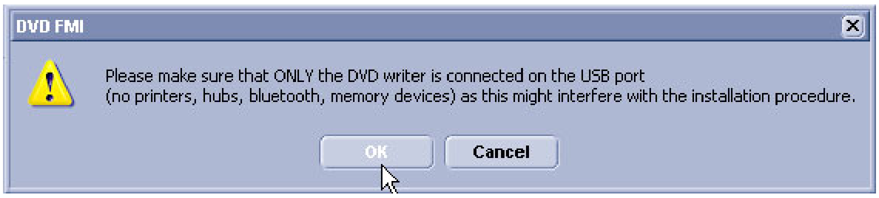
Please connect the AC power supply and make sure the accumulator charge is at least 60%.

Figure 8-19 battery less charged or Power supply is disconnected

In this case, connect the Power supply to charge the battery, afterwards try again.

NOTE: To check capacity of the battery, move the cursor over the ***Battery Icon*** *in the status area (see: Figure 5-11 on page 5-31).*

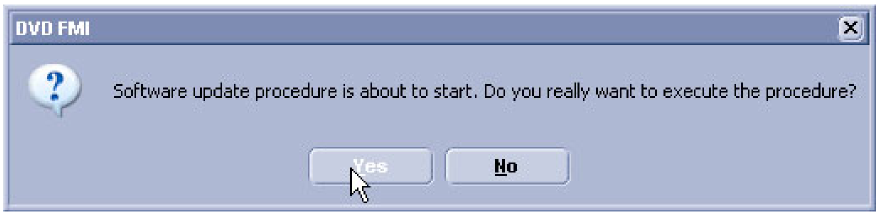
10.) Verify that only the DVD drive is connected to the system, then click OK (Figure 8-20 below).



Please make sure that ONLY the DVD writer is connected on the USB port
(no printers, hubs, bluetooth, memory devices) as this might interfere with the installation procedure.

Figure 8-20 Verify that USB devices are disconnected, then click OK

11.) To start update procedure click YES (Figure 8-21 below).



Software update procedure is about to start. Do you really want to execute the procedure?

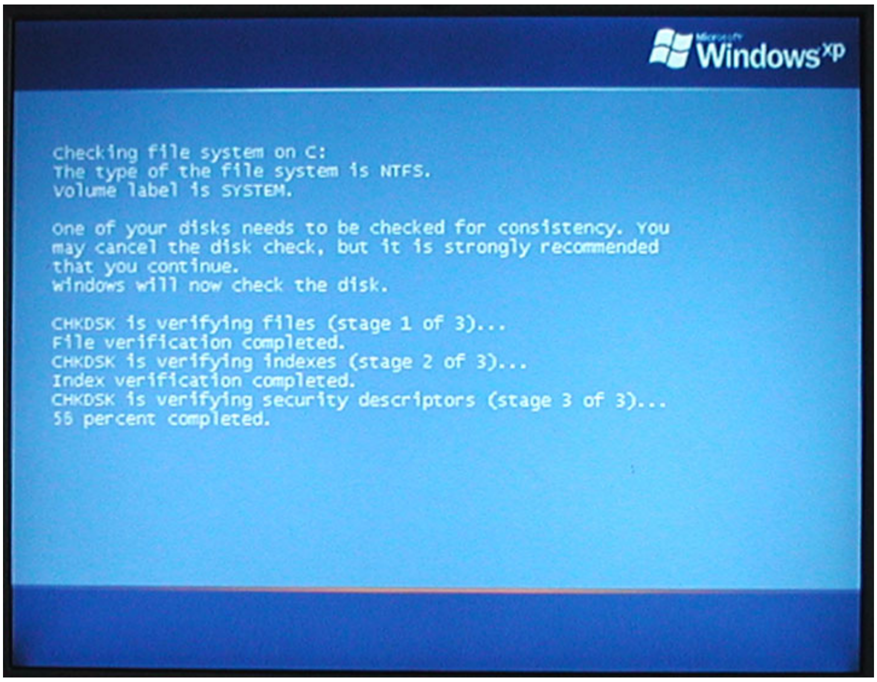
Figure 8-21 Yes - start update procedure

12.) The system saves Full Backup in silent mode on R:, then it reboots into LINUX.

13.) A silent "Rollback" image from C:\ is stored on R:\.
After executing all LINUX commands, the system reboots again.

8-2-2-5 System Software - Installation Procedure (FMI from external device) (cont'd)

14.)Check disk is performed automatically - restart.



```
Checking file system on C:
The type of the file system is NTFS.
Volume label is SYSTEM.

One of your disks needs to be checked for consistency. You
may cancel the disk check, but it is strongly recommended
that you continue.
Windows will now check the disk.

CHKDSK is verifying files (stage 1 of 3)...
File verification completed.
CHKDSK is verifying indexes (stage 2 of 3)...
Index verification completed.
CHKDSK is verifying security descriptors (stage 3 of 3)...
55 percent completed.
```

Figure 8-22 Check disk is performed automatically

15.)3 dots (one after the other) appear on the screen (see: Figure 8-23 below).

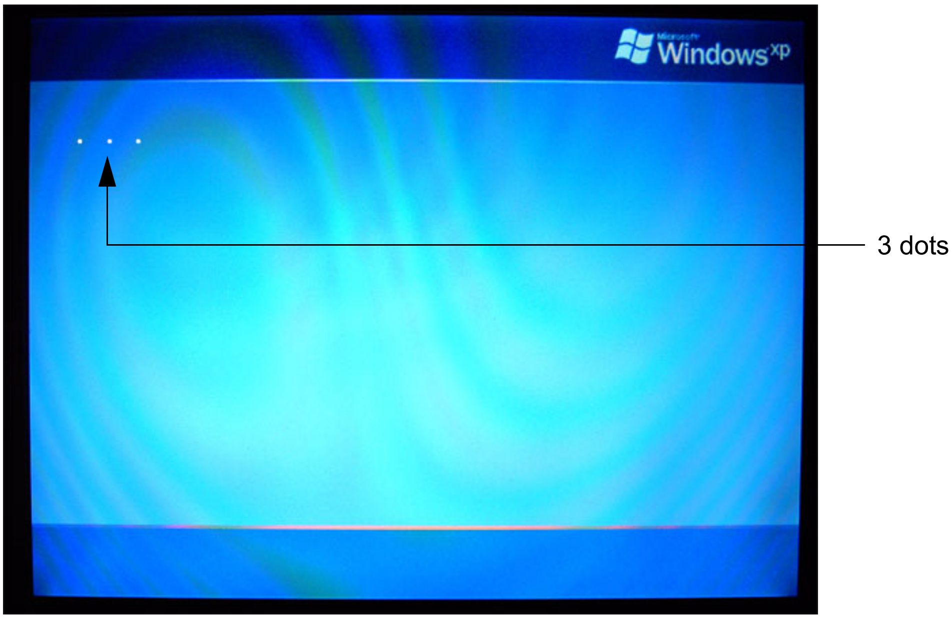


Figure 8-23 3 dots appear on the screen

8-2-2-5 System Software - Installation Procedure (FMI from external device) (cont'd)

16.)Booting **auto**.....

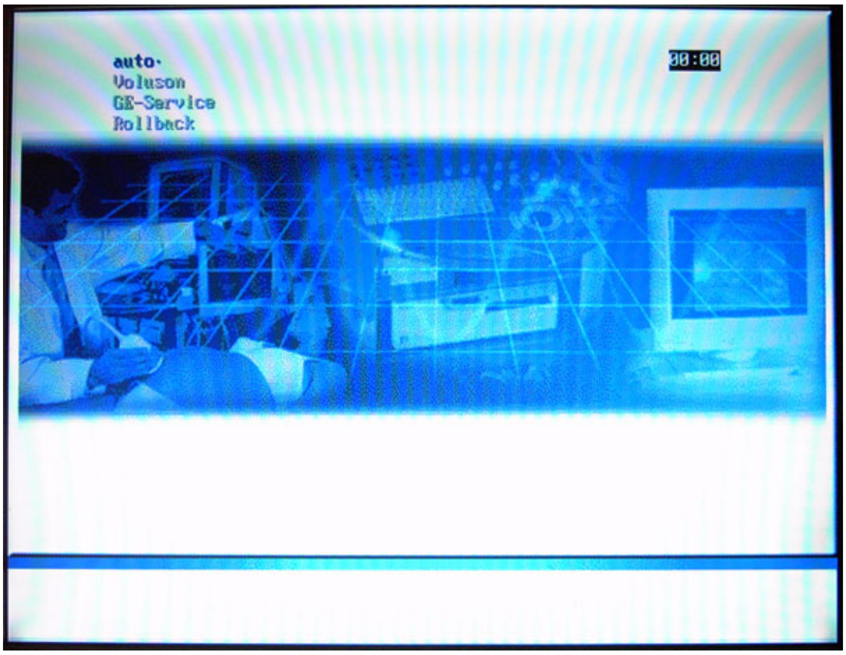
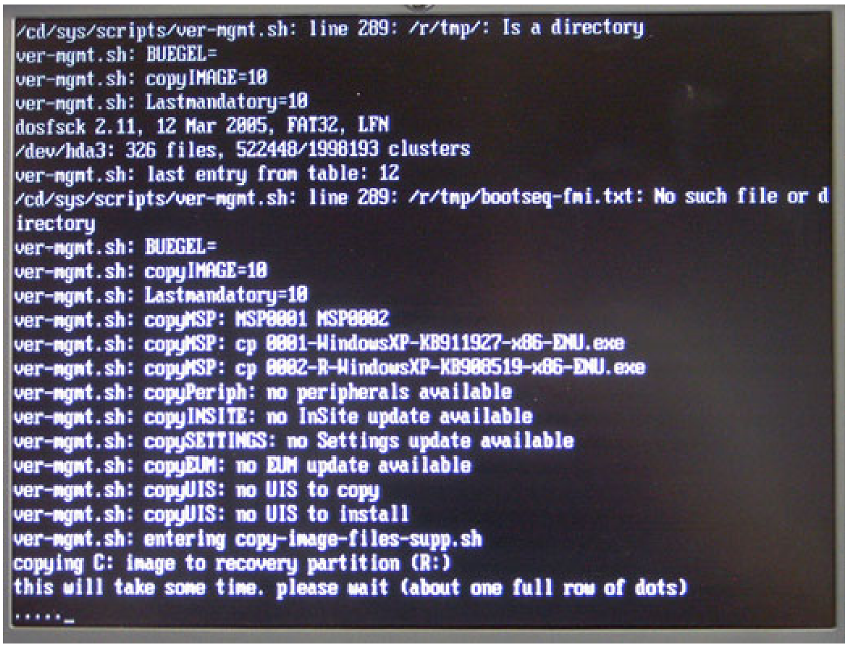


Figure 8-24 Boot screen - auto

17.)Updating will take some time......



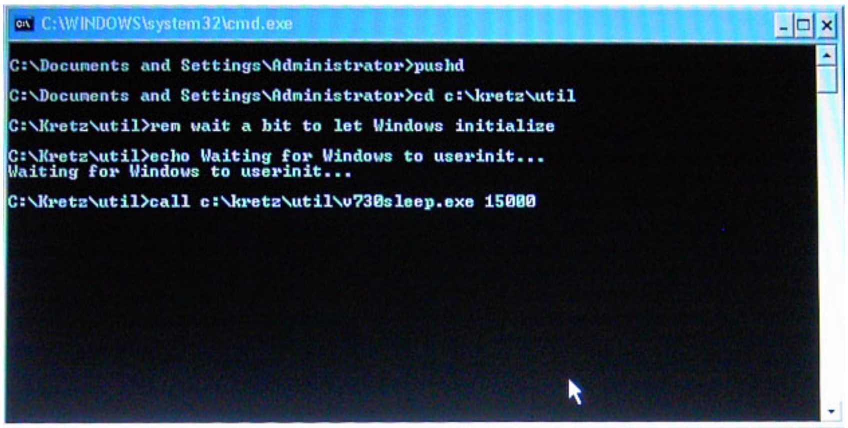
```
/cd/sys/scripts/ver-mgmt.sh: line 289: /r/tmp/: Is a directory
ver-mgmt.sh: BUEGEL=
ver-mgmt.sh: copyIMAGE=10
ver-mgmt.sh: Lastmandatory=10
dosfsck 2.11, 12 Mar 2005, FAT32, LFN
/dev/hda3: 326 files, 522448/1998193 clusters
ver-mgmt.sh: last entry from table: 12
/cd/sys/scripts/ver-mgmt.sh: line 289: /r/tmp/bootseq-fmi.txt: No such file or d
irectory
ver-mgmt.sh: BUEGEL=
ver-mgmt.sh: copyIMAGE=10
ver-mgmt.sh: Lastmandatory=10
ver-mgmt.sh: copyMSP: MSP0001 MSP0002
ver-mgmt.sh: copyMSP: cp 0001-WindowsXP-KB911927-x86-ENU.exe
ver-mgmt.sh: copyMSP: cp 0002-R-WindowsXP-KB908519-x86-ENU.exe
ver-mgmt.sh: copyPeriph: no peripherals available
ver-mgmt.sh: copyINSITE: no InSite update available
ver-mgmt.sh: copySETTINGS: no Settings update available
ver-mgmt.sh: copyEUM: no EUM update available
ver-mgmt.sh: copyUIS: no UIS to copy
ver-mgmt.sh: copyUIS: no UIS to install
ver-mgmt.sh: entering copy-image-files-supp.sh
copying C: image to recovery partition (R:)
this will take some time. please wait (about one full row of dots)
....._
```

Figure 8-25 Please wait....

18.)Please wait until all processes are finished (100 percent completed).

8-2-2-5 System Software - Installation Procedure (FMI from external device) (cont'd)

19.)The system is rebooting into windows (Boot screen - **Voluson**).

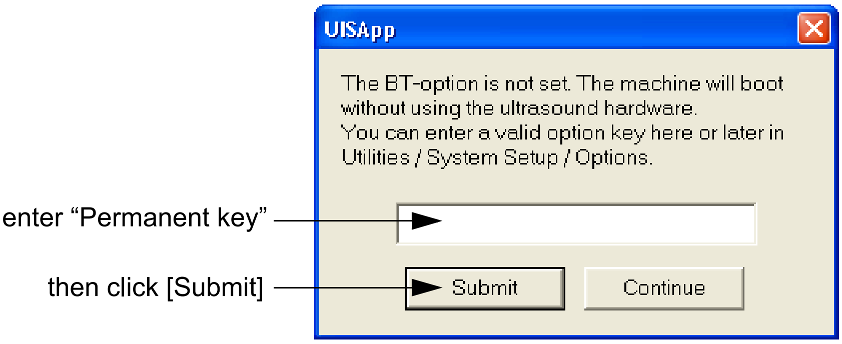


```
C:\Documents and Settings\Administrator>pushd

C:\Documents and Settings\Administrator>cd c:\kretz\util

C:\Kretz\util>rem wait a bit to let Windows initialize

C:\Kretz\util>echo Waiting for Windows to userinit...
Waiting for Windows to userinit...

C:\Kretz\util>call c:\kretz\util\v730sleep.exe 15000
```

Figure 8-26 automatic processes are running

20.)Please wait until all processes are finished. Finally the 2D screen is displayed on the monitor.

NOTE: If the BT warning dialog (Figure 8-27 below) appears, enter the Permanent key previously recorded (refer to Figure 8-17: Option page (e.g., Voluson i) on page 8-15) and then click SUBMIT.



The BT-option is not set. The machine will boot without using the ultrasound hardware.
You can enter a valid option key here or later in Utilities / System Setup / Options.

enter “Permanent key”

then click [Submit]

Figure 8-27 Enter Permanent key

21.)Remove the Stick from the USB port on the rear of the system.

22.)**Reconnect the external devices**, install all the printers and adjust the printer settings as described in Section 3-7 "Printer Installation" on page 3-80.

23.)Check and match system settings in the P1-P2-P3 page´s [Print], [Save] and [Export] tab.

24.)Confirm that the date and time are set correctly and that the Windows automatic DST feature is off. Refer to Section Section 6-10 "Daylight Saving Time (DST) - New Dates" on page 6-12.

Section 8-3
User Settings Only (Application Settings) Loading Procedure

8-3-1 Introduction

The User Settings contains:

- User Programs
- Auto Text
- 3D/4D Programs

8-3-2 Loading Procedure

see: Section 4-5-2 "Load User Settings Only (Application Settings)" on page 4-30

Section 8-4
Full Backup (Presets, Configurations & Appl. Settings) Loading Procedure

8-4-1 Introduction

The Full Backup contains following data:

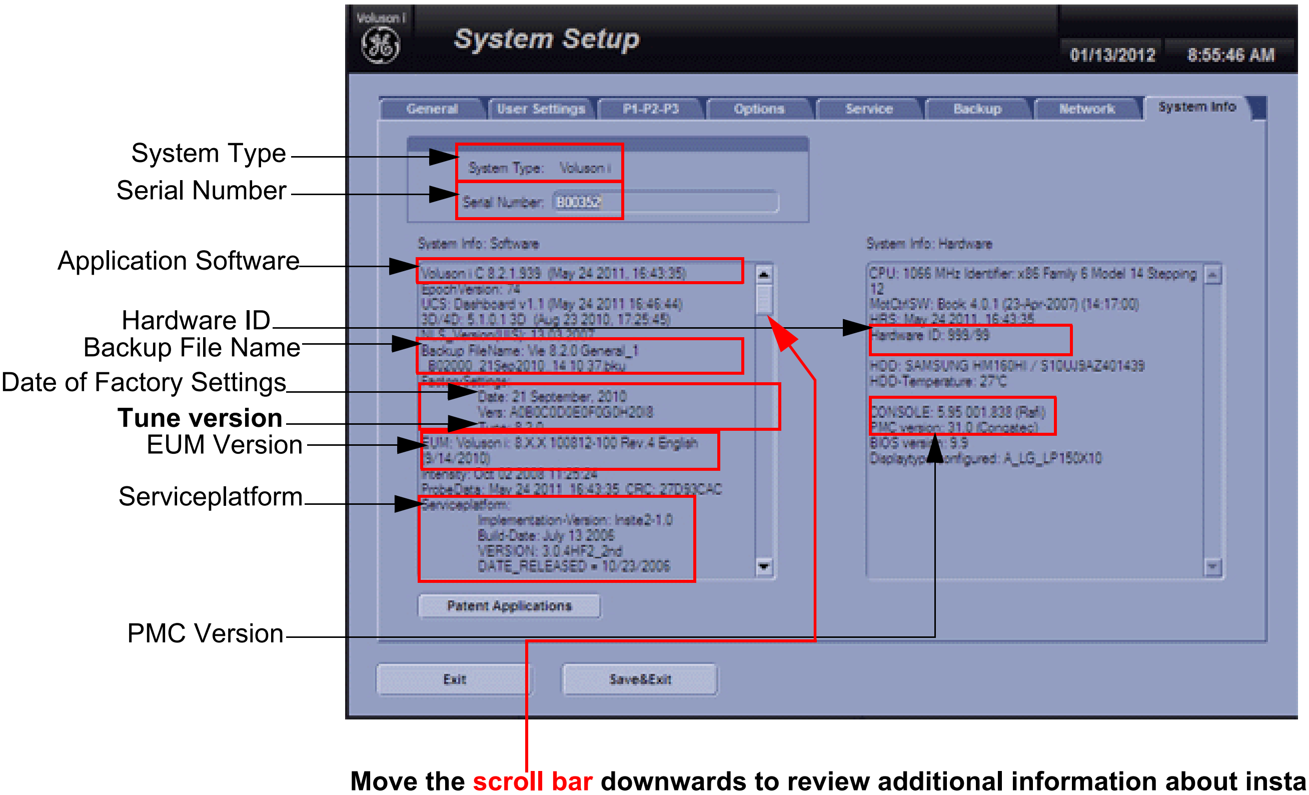
- Patient demographic and exam data (database containing the patient data and measurements)
- SonoView image data (**NOT** available when saving to the internal hard disk or DVD/CD)
- User Settings (databases and files containing gray curves and the user settings.)
- Image transfer settings (DICOM® settings e.g., DICOM® servers, AE Title, Station Name, etc.)
- Measure Setup Settings (user specific measure settings)
- Machine settings (general settings such as language, time/date format and the enabled options)
- Windows Network Settings (network settings including the computer name)
- Serviceplatform (state of the Service Software)
- VP (additional system data)

8-4-2 Loading Procedure

see: Section 4-5-4 "Load Full Backup (Presets, Configurations & Application Settings)" on page 4-34

Section 8-5
Software and Functional Checks after Installation/Upgrade Procedure

1.) Press the **UTILITIES** key on the control panel once to display the Utilities menu.
2.) Select the SYSTEM item from the Utilities menu - which is displayed on the left side of the screen.
3.) Select SYSTEM INFO to see which Software/Hardware version is installed in the unit.


Voluson i
System Setup
01/13/2012
8:55:46 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Patent Applications
Exit
Save&Exit
System Type
Serial Number
Application Software
Hardware ID
Backup File Name
Date of Factory Settings
Tune version
EUM Version
Serviceplatform
PMC Version

System Type: Voluson i
Serial Number: B00352

System Info: Software

Voluson i C 8.2.1.939 (May 24 2011, 16:43:35)
EpochVersion: 74
UCS: Dashboard v1.1 (May 24 2011 16:46:44)
3D/4D: 5.1.0.1 3D (Aug 23 2010, 17:25:45)
NLS_Version(UIS): 13.03.2007
Backup FileName: Vie 8.2.0 General_1
_B02000_21Sep2010_14.10.37.bku
FactorySettings:
Date: 21 September, 2010
Vers: A0B0C0D0E0F0G0H2018
Tune: 8.2.0
EUM: Voluson i: 8.X.X 100812-100 Rev.4 English
(9/14/2010)
Intensity: Oct 02 2008 11:25:24
ProbeData: May 24 2011 16:43:35 CRC: 27D93CAC
Serviceplatform:
Implementation-Version: Inste2-1.0
Build-Date: July 13 2006
VERSION: 3.0.4HF2_2nd
DATE_RELEASED = 10/23/2006

System Info: Hardware

CPU: 1066 MHz Identifier: x86 Family 6 Model 14 Stepping 12
MotCtrlSW: Book 4.0.1 (23-Apr-2007) (14:17:00)
HRS: May 24 2011, 16:43:35
Hardware ID: 999/99
HDD: SAMSUNG HM160HI / S10UJ9AZ401439
HDD-Temperature: 27°C
CONSOLE: 5.95 001.838 (RaR)
PMC version: 31.0 (Congatec)
BIOS version: 9.9
Displaytype configured: A_LG_LP150X10

Move the scroll bar downwards to review additional information about installed software/hardware (e.g., Operating System - Service Pack)

Figure 8-28 System Setup - System Info page

4.) Check the Application Software version.
5.) Check that the Tune version of the Application presets match the Application Software version.
6.) Verify the correct settings of the OPTION page; see: Figure 8-2 on page 8-5.
If necessary, customize the settings according to the printout.
7.) Restart the system and perform basic functional checks to ensure system is functioning normally.

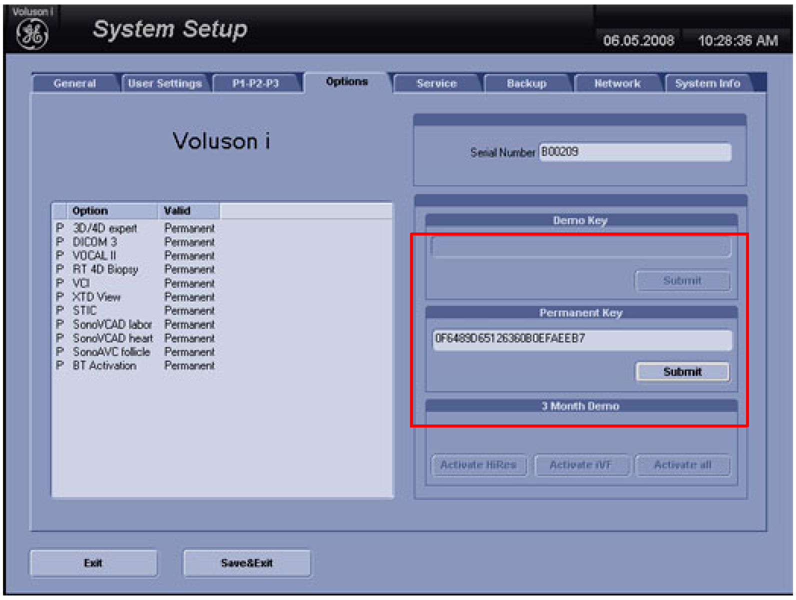
Section 8-6
Replacement or Activation of Options

- **Following Options are available on Voluson i systems:**
  - Volume Ultrasound (3D Mode, Real Time 4D, VOCAL and TUI)
  - VOCAL (seperat option on BT´09)
  - DICOM® 3
  - RT 4D Biopsy
  - XTD View
  - VCI
  - SonoAVC
  - SonoVCAD heart
  - SonoVCAD labor
  - STIC
  - SonoNT
  - SonoRS
- **Following Options are available on Voluson e systems:**
  - DICOM® 3
  - 4D Basic (4D rendering only, no 3D Mode and no access to volume data)
  - 3D/4D Advanced (3D Mode and Real Time 4D)
  - RIC Probe
  - RO (RAB Probes)
  - SonoVCAD labor
  - XTD View
  - SonoAVC
  - SonoNT
  - SonoRS

NOTE: Additional option fields are not yet implemented in the Voluson i / Voluson e.

8-6-1 Operation for activating Options

1.) Press the UTILITIES key on the keyboard to display the Utilities menu.
2.) Select the SYSTEM item from the menu area to invoke the setup desktop on the screen.
3.) Select the OPTION page where you can see which options are installed in the system.


Voluson i
System Setup
06.05.2008
10:28:36 AM
General
User Settings
P1-P2-P3
Options
Service
Backup
Network
System Info
Voluson i
Demo Key
Submit
Permanent Key
Submit
3 Month Demo
Activate HiRes
Activate iVF
Activate all
Exit
Save&Exit

Serial Number B00209

	Option	Valid
P	3D/4D expert	Permanent
P	DICOM 3	Permanent
P	VOCAL II	Permanent
P	RT 4D Biopsy	Permanent
P	VCI	Permanent
P	XTD View	Permanent
P	STIC	Permanent
P	SonoVCAD labor	Permanent
P	SonoVCAD heart	Permanent
P	SonoAVC follicle	Permanent
P	BT Activation	Permanent

Permanent Key: 0F6489D65126360B0EFAEEB7

D = Demo
(Option is activated for demo and expires on the date shown in the “Valid” column)

I = Inactive
(Option is not activated)

P = Permanent
(Option is permanently activated [purchased])

Figure 8-29 Option page in the System Setup (e.g., Voluson i)

8-6-1-1 Operation for installing a “Demo Key” or the “Permanent Key”:

1.) Position the cursor inside the input field desired and press the **right/left trackball** key.
2.) If one exists, clear/edit the current key code.
3.) Enter the encrypted serial code with the keyboard and click on SUBMIT. (Code will be checked.)
4.) Click the SAVE&EXIT button.

NOTE: *After activating a key code, restart (turn off and on) the Voluson i / Voluson e system.*

Section 8-7
Replacement of Key Caps (by special native language keys)

NOTICE Table 9-3 on page 9-5 shows the available Key Cap Kits.
Keys to be removed depend on the (special native) language kit.

8-7-1 Manpower

One person, 30 minutes

8-7-2 Tools

small-sized slotted screwdriver or tweezers

8-7-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-7-4 Key Caps - Removal Procedure

1.) Carefully place a small flat screwdriver between the key cap you wish to remove and its neighboring key cap.

2.) Gently lift the key cap, until it is completely loosened from its base (see Figure 8-30 below).

3.) Remove the key cap.

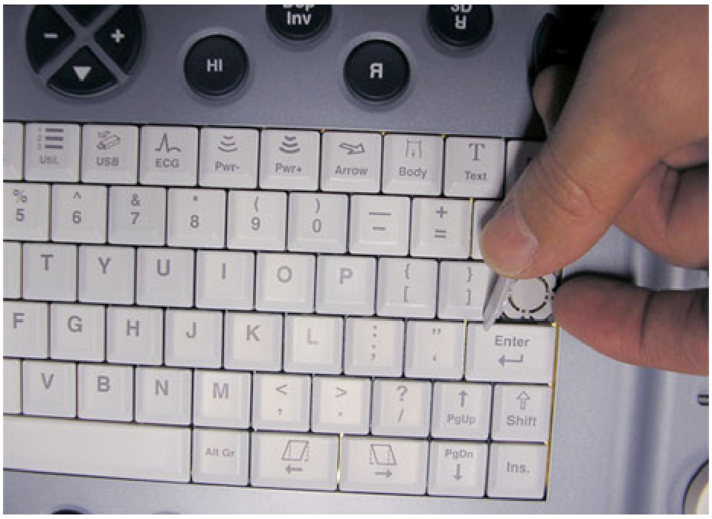


Figure 8-30 Key Cap Replacement

8-7-5 Key Cap - Installation Procedure

1.) Carefully place the appropriate key cap in position on the keyboard, taking care to place the plastic alignment pin in the correct position so that the key cap is the right way up and reads correctly.

2.) Push the key cap down until it snaps into position.

3.) Power On/Boot Up the system; see: Section 3-6-2 on page 3-69.

4.) Setup the Keyboard Language Layout as described in Section 6-9 on page 6-10 and then type with the keyboard to check the function of each key.

Section 8-8
Replacement of TGC Slider controls

8-8-1 Manpower

One person, 5 minutes

8-8-2 Tools

small-sized slotted screwdriver or tweezers

8-8-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-8-4 TGC Slider - Removal Procedure

1.) Gently lift the defective key cap, until it is completely loosened from its base.

2.) Remove the defective Slider-potentiometer cap - see Figure 8-31 below.

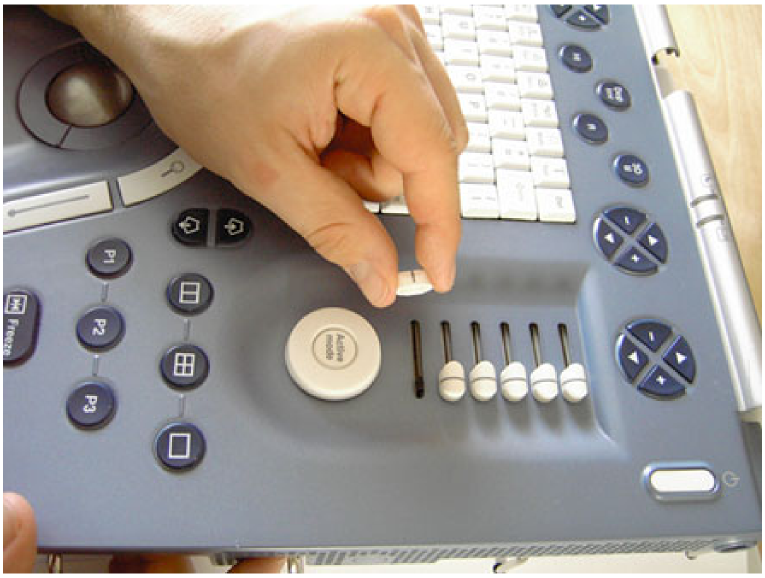


Figure 8-31 TGC Slider Replacement

8-8-5 TGC Slider - Installation Procedure

1.) Place a new slider cap in position on the slider base and push it down until it snaps into position.

Section 8-9
Replacement of the Rotary Knob

8-9-1 Manpower

One person, 5 minutes

8-9-2 Tools

small-sized slotted screwdriver or tweezers

8-9-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-9-4 Rotary Knob - Removal Procedure

1.) Carefully place a small flat screwdriver between the Rotary Knob and the surface of the keyboard - see Figure 8-32 below.

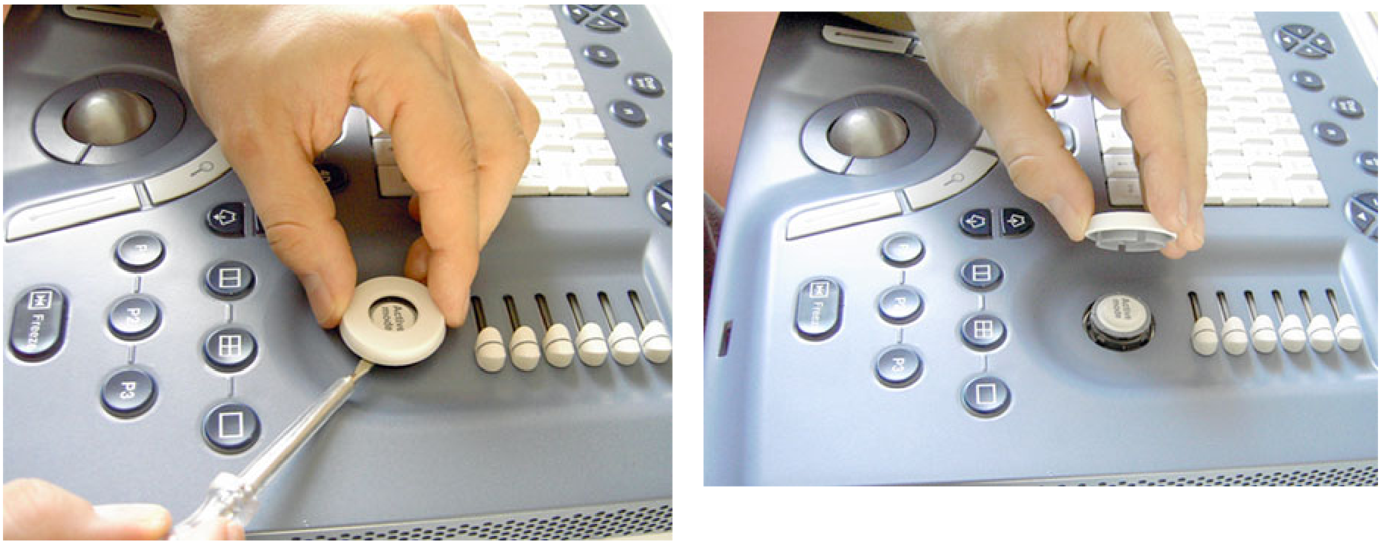


Figure 8-32 Rotary Digipot Replacement

2.) Gently lift the defective Rotary Knob, until it is completely loosened from its base.

3.) Remove the defective knob.

8-9-5 Rotary Knob - Installation Procedure

1.) Place a new Rotary Knob in position on the keyboard, taking care to place the plastic alignment pin in the correct location.

2.) Push the Rotary Knob down until it snaps into position.

Section 8-10
Replacement of the Handle

NOTE: The term "Handle" relates to the Voluson i / Voluson e portable carrying handle.

8-10-1 Manpower

10 minutes

8-10-2 Tools

Use the appropriate flat and Phillips screw drivers as indicated in the Handle replacement procedure.

8-10-3 Preparations

none

8-10-4 Handle - Removal Procedure

1.) Close the LCD cover, making sure both front latches are securely fastened.

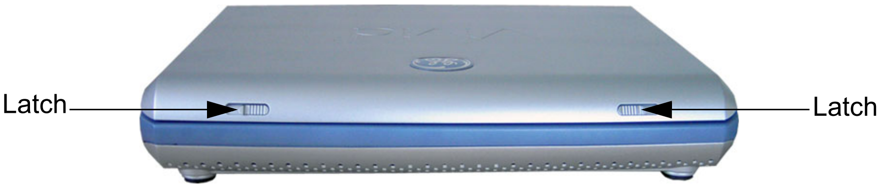


Figure 8-33 Closing LCD Cover

2.) Release the captive screw on either side of the Handle (there are two screws that secure the handle in position), by turning 1/4 turn in a *counterclockwise* direction.

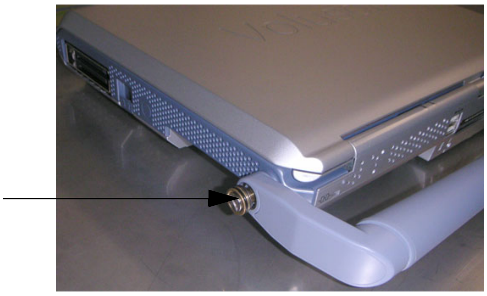


Figure 8-34 Release the captive screws

3.) Using both hands, pull the Handle slightly apart to release it from the system.

4.) Remove the Handle.

8-10-5 Handle - Installation Procedure

1.) Place a new Handle in position, using both hands to pull the Handle slightly apart in order to slot the ends into the handle holes on the Voluson i / Voluson e casing.

2.) Carefully fasten each captive screw on either side of the Handle to secure the handle in position, by turning 1/4 turn in a *clockwise* direction.

NOTE: When tightening the captive screws, do not use excessive force do not apply more than 1/4 turn; overtightening will damage the screw thread.

Section 8-11
Replacement of the GPA - Battery

8-11-1 Manpower

One person, 1 minute

8-11-2 Tools

none

8-11-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-11-4 Battery - Removal Procedure

1.) Disconnect the AC adapter and all cables from the Voluson i / Voluson e system.

2.) Close the LCD cover, making sure both front latches are securely fastened.

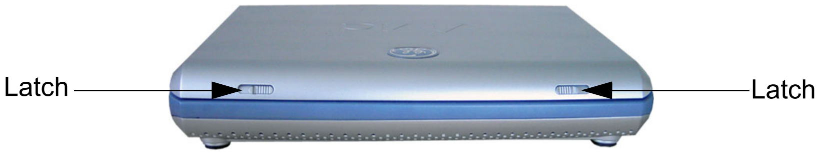


Figure 8-35 Closing LCD Cover

3.) Carefully turn the Voluson i / Voluson e system and place it system face down.

4.) While holding the Voluson i / Voluson e steady, pull the locking latch away from the battery and slide the battery sideways out of the battery compartment to remove it completely from the system.

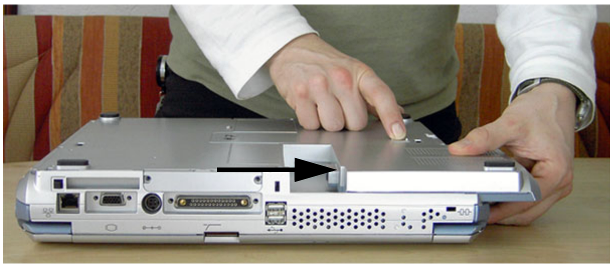


Figure 8-36 Sliding the Battery out of the Battery Compartment

⚠ **NOTICE** When removing a defective battery, ensure that it is disposed of in accordance with local regulations. Alternatively, forward it to GE for proper disposal.

⚠ **WARNING** **The Voluson i / Voluson e battery has a safety device.**
***DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY*! Always observe the precautions listed in *Voluson i / Voluson e Battery Safety on page 1-14*.**

⚠ **CAUTION** **Use only batteries approved by GE as suitable for use with the Voluson i / Voluson e portable ultrasound system.**

1.) With the Voluson i / Voluson e lying face down (refer to Figure 8-36 on page 8-29), hold the unit steady with one hand while sliding the battery sideways into the battery compartment.

2.) Make sure the battery is properly inserted, before pushing the locking latch to the closed position.

3.) Reconnect the AC adapter and all cables to the Voluson i / Voluson e system.

Section 8-12
Replacement of the Display Front Frame

8-12-1 Manpower

One person, 15 minutes

8-12-2 Tools

Phillips screwdriver 1 and 2

8-12-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-12-4 Display Front Frame - Removal Procedure

1.) With the LCD Display in open (upright) position, remove the screw cap from each of the 5 screws (see: Figure 8-37 below) and then remove the 5 screws that fasten the front frame in position.

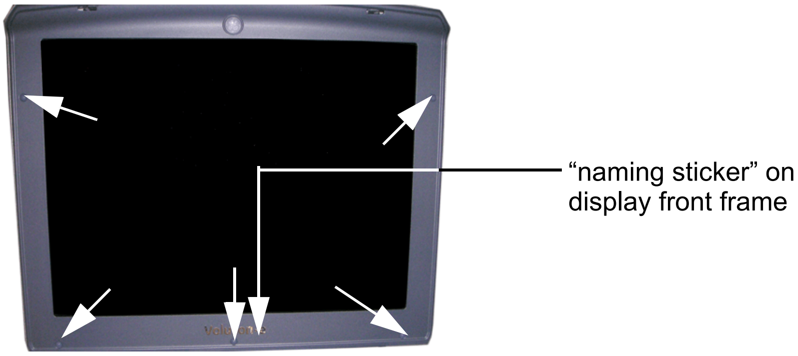


Figure 8-37 remove screw caps and screws from the LCD Display Frame

2.) With the LCD Display in the fully open position, carefully release the LCD display frame from the securing clips on all four sides. Use both hands to release and lift it away from the LCD display.

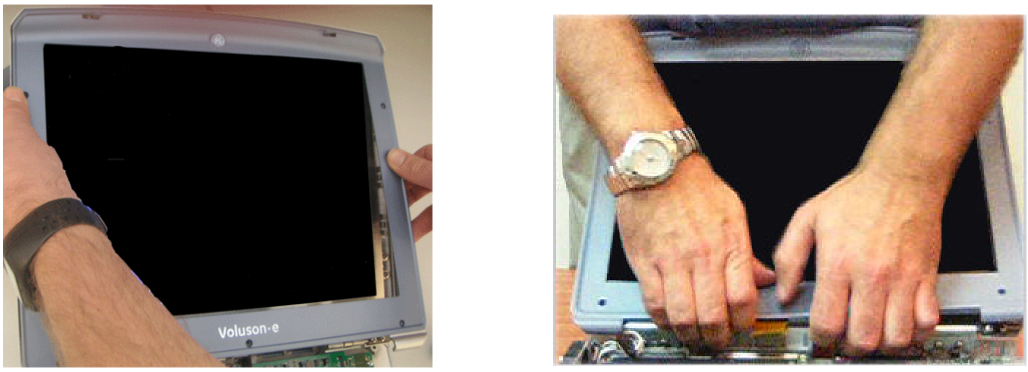


Figure 8-38 carefully remove the LCD Display Frame

8-12-5 Display Front Frame - Installation Procedure

1.) With the LCD Display in the fully open position, return the front frame to the correct position. Using both hands, press the frame under the securing clips on all four sides (see: Figure 8-38, above).

2.) Thighten the 5 screws that fasten the LCD frame in position and cover them with the 5 screw caps.

3.) Attach the correct naming sticker on the front frame of the Voluson i / Voluson e system.

Section 8-13
Replacement of the Display Latches (right/left)

8-13-1 Manpower

One person, 25 minutes

8-13-2 Tools

Phillips screwdriver 1 and 2

8-13-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the LCD Display Frame as described in Section 8-12-4 on page 8-30.

8-13-4 Latches - Removal Procedure

1.) Using your thumbnail push back the spiral spring, remove the sliding disk and then remove the complete latch assembly.

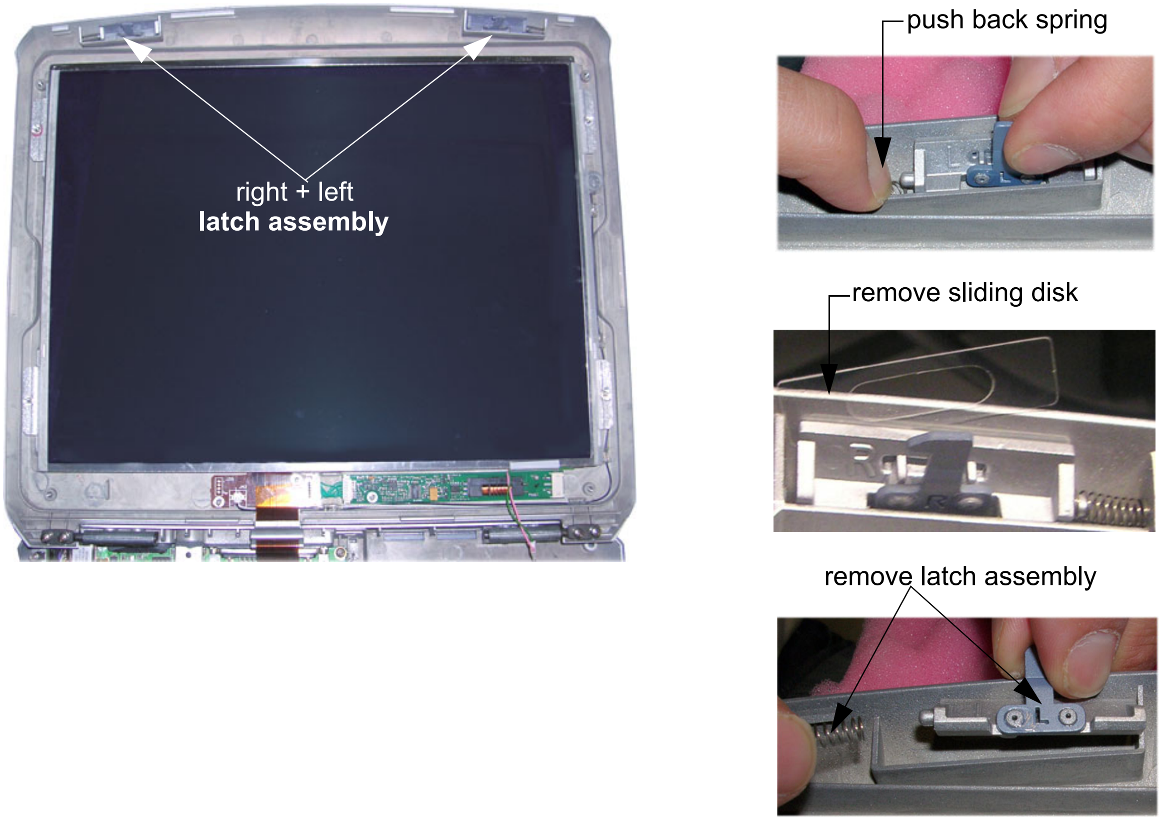


Figure 8-39 push back the spring, remove sliding disk and then remove the complete latch assembly

8-13-5 Latches - Installation Procedure

1.) Place the new latch assemblies into their original position, place the sliding disk and fix them with the spiral spring.(refer to Figure 8-39, above).
2.) Mount the LCD Frame as described in Section 8-12-5 on page 8-30.

Section 8-14
Replacement of the BBDI Rigid Flex Assembly

8-14-1 Manpower

One person, 40 minutes

8-14-2 Tools

Phillips screwdriver 1 and 2

8-14-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) **Disconnect** all external **USB-devices** (e.g., USB printer).
3.) Remove the Battery as described in Section 8-11-4 on page 8-29.
4.) Remove the Handle as described in the Section 8-10-4 on page 8-28.
5.) Remove the Keyboard module as described in Section 8-15-4 on page 8-37.
6.) Remove the LCD Display Frame as described in Section 8-12-4 on page 8-30.

8-14-4 Rigid Flex Assy - Removal Procedure

1.) Loosen the 2 screws, move the bracket which fasten the BBDI Rigid Flex forwards and remove it.

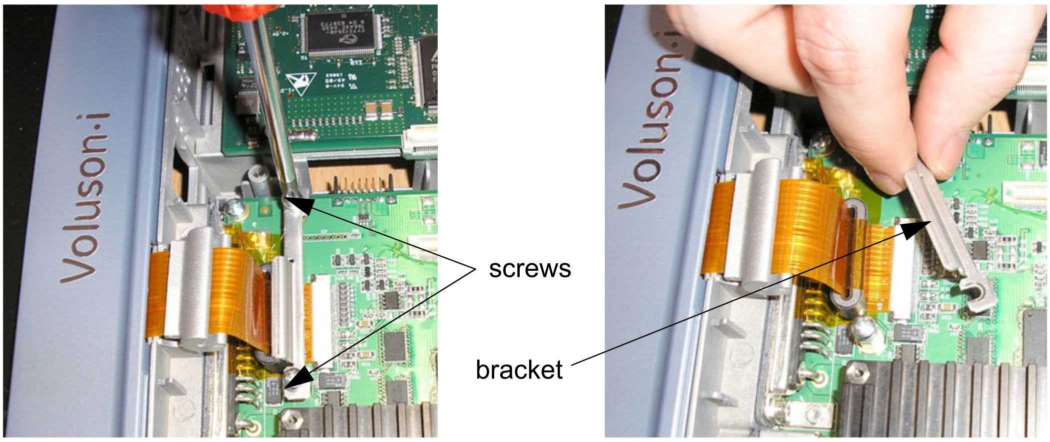


Figure 8-40 loosen screws and remove bracket

8-14-4 Rigid Flex Assy - Removal Procedure (cont'd)

2.) Using a small slotted screwdriver or your nails, release the locking “noses” at the Rigid Flex connector and then disconnect (pull out) the BBDI Rigid Flex.

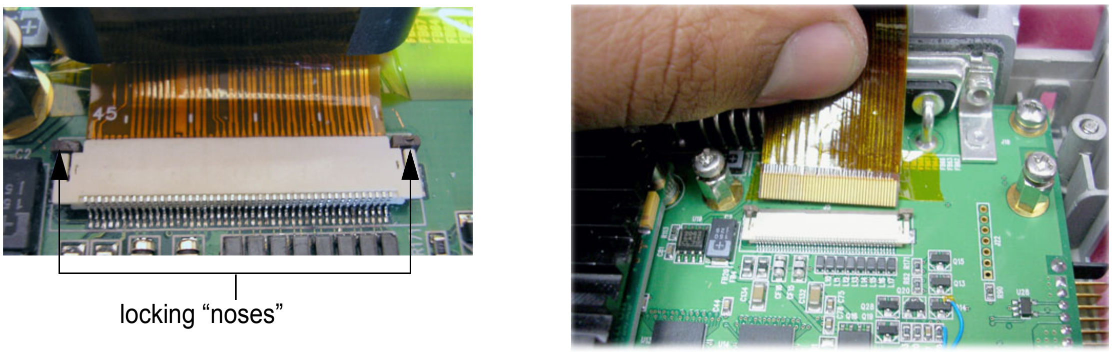


Figure 8-41 release locking “noses” and then disconnect the Rigid Flex

3.) Remove the BBDI Rigid Flex Assembly (inclusive Flex Cover and Ferrite; see: Figure 8-42 below.

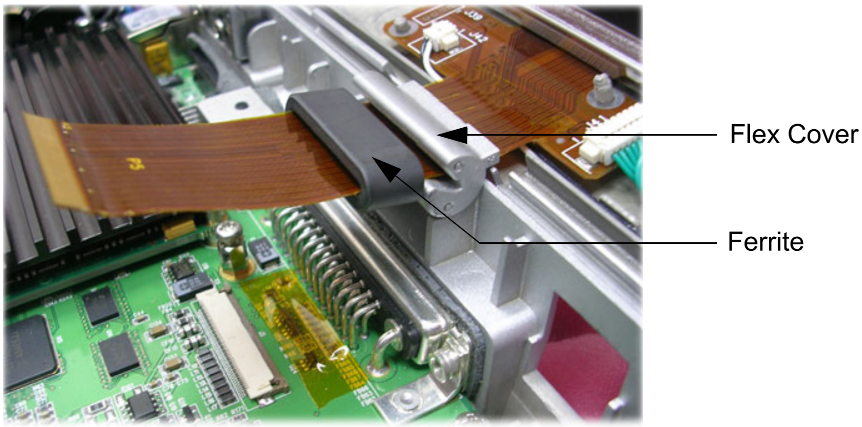


Figure 8-42 remove BBDI Rigid Flex Assembly

4.) Loosen and remove the 5 screws that fasten the LCD Display at the Rear Cover Assembly, as shown Figure 8-43 below.

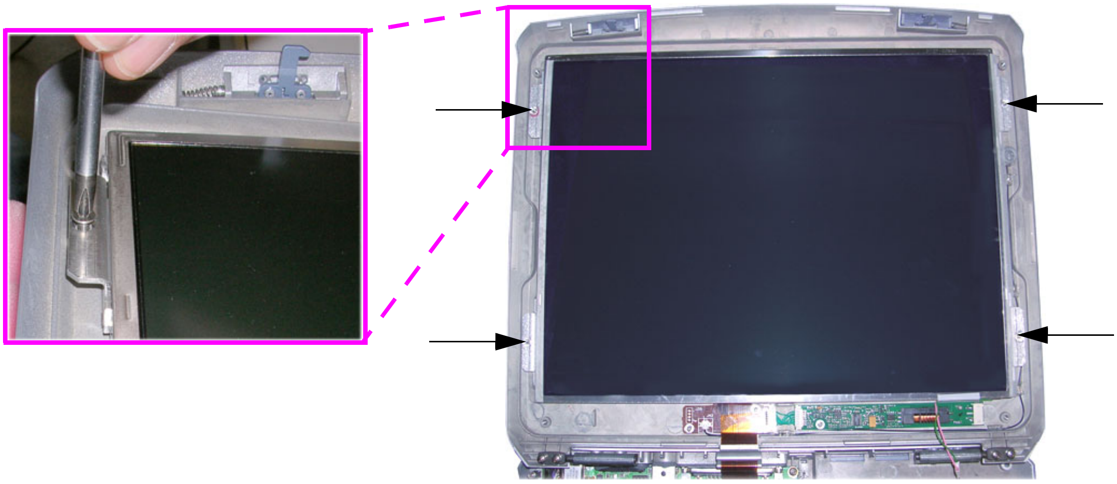


Figure 8-43 remove 4 screws that fasten LCD Display

8-14-4 Rigid Flex Assy - Removal Procedure (cont'd)

5.) Disconnect the Microphone and the BBDI Inverter cable from the Flex (see: Figure 8-44 below).

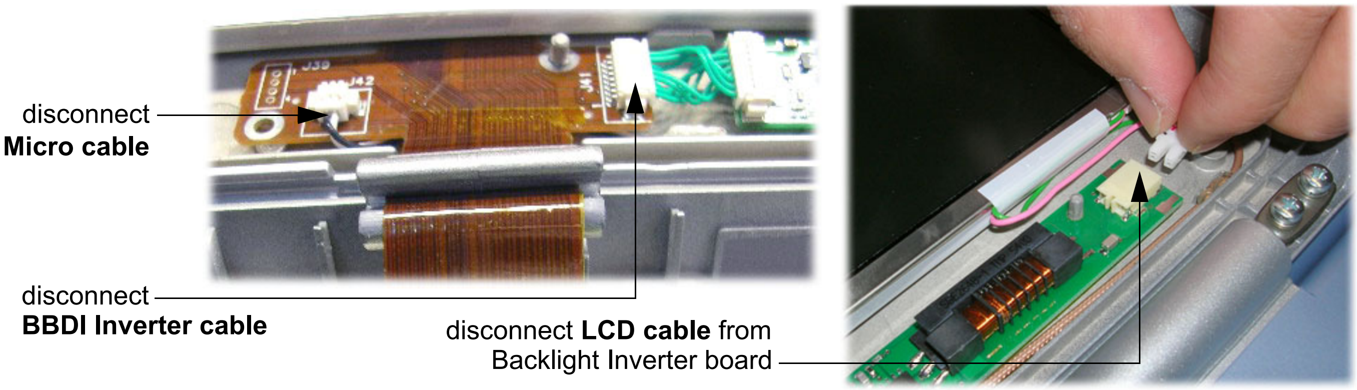

disconnect
Micro cable
disconnect
BBDI Inverter cable
disconnect **LCD cable** from
Backlight Inverter board

Figure 8-44 disconnect cables

6.) Disconnect the LCD Display cable from the Backlight Inverter board (see: Figure 8-44, above).

7.) Carefully lift the LCD Display upwards to gain access to the connector underneath.
Remove the kapton tape from the LCD rear panel and disconnect and remove the BBDI Rigid Flex.

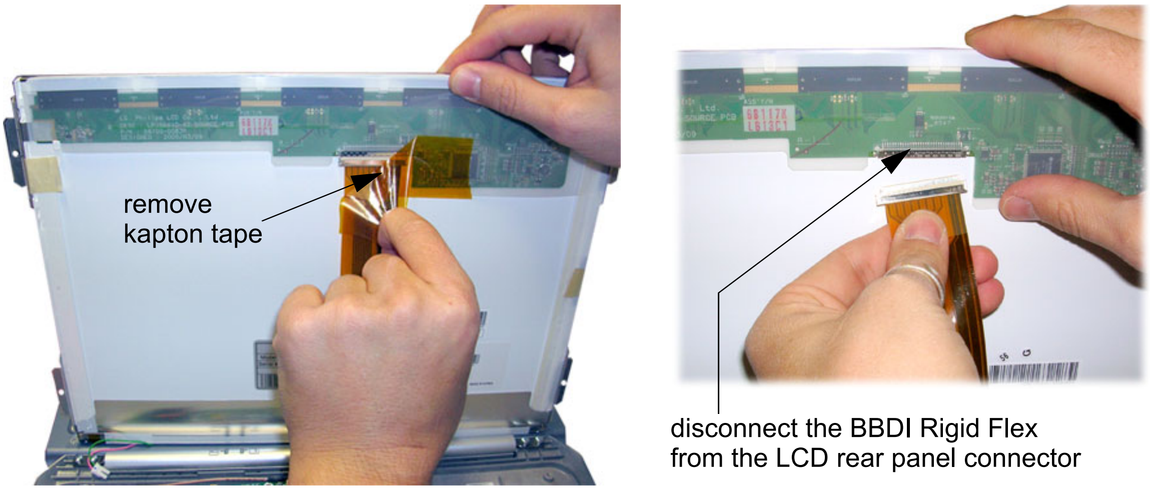

remove
kapton tape
disconnect the BBDI Rigid Flex
from the LCD rear panel connector

Figure 8-45 remove kapton tape and disconnect Rigid Flex

8-14-5 Rigid Flex Assy - Installation Procedure

1.) Connect the new Rigid Flex to the LCD rear panel connector and cover it with the kapton tape, as shown in Figure 8-45, above.

2.) Place the LCD Display to its original position. Connect the BBDI Inverter cable and the microphone cable to the Flex (refer to Figure 8-44 on page 8-34).

3.) Fasten the screws that fixate LCD Display onto the Rear Cover (see: Figure 8-43 on page 8-33).

4.) Thread the flex cover and ferrite back into position, as shown in Figure 8-42 on page 8-33.

5.) Insert the BBDI Rigid Flex into the connector and lock it (refer to Figure 8-41 on page 8-33).

6.) Mount the bracket and tighten the 2 screws, as shown in Figure 8-40 on page 8-32.

7.) Mount the LCD Display Frame as described in Section 8-12-5 on page 8-30.

8.) Mount the keyboard module, the battery, the Handle and reconnect the AC adapter; as described in Section 8-15-5 on page 8-40.

Section 8-15
Replacement of the LCD Backlight Inverter Board

8-15-1 Manpower

One person, 25 minutes

8-15-2 Tools

Phillips screwdriver 1 and 2

8-15-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the LCD Display Frame as described in Section 8-12-4 on page 8-30.

8-15-4 Backlight Inverter Board - Removal Procedure

1.) Loosen and remove the 5 screws that fasten the LCD Display at the Rear Cover Assembly. Refer to Figure 8-43 on page 8-33.
2.) Disconnect the Inverter and LCD cable from the Backlight Inverter board (see: Figure 8-46 below).

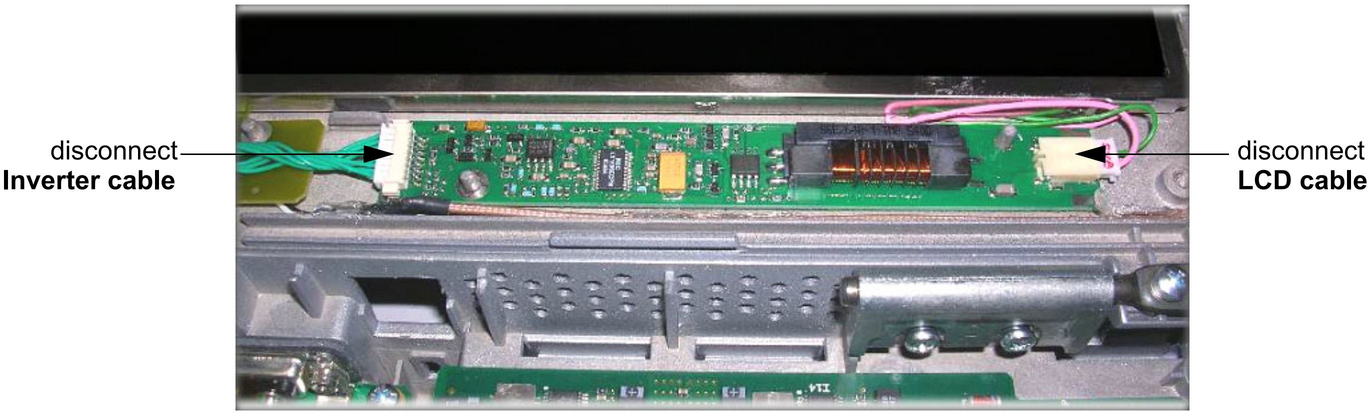


Figure 8-46 disconnect cables from Backlight Inverter board

3.) Remove the Backlight Inverter board from the Rear Cover Assembly.

8-15-5 Backlight Inverter Board - Installation Procedure

1.) Place the new Backlight Inverter board in its original position.
2.) Reconnect the Inverter cable and the LCD cable to the board (refer to Figure 8-46, above).
3.) Mount the LCD Display Frame as described in Section 8-12-5 on page 8-30.

Section 8-16
Replacement of the LCD Display

8-16-1 Manpower

One person, 50 minutes

8-16-2 Tools

Phillips screwdriver 1 and 2

8-16-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Remove the LCD Display Frame as described in Section 8-12-4 on page 8-30.

8-16-4 LCD Display - Removal Procedure

1.) Loosen and remove the 8 screws that fasten the LCD Display to the Rear Cover Assembly, as shown Figure 8-47 below.

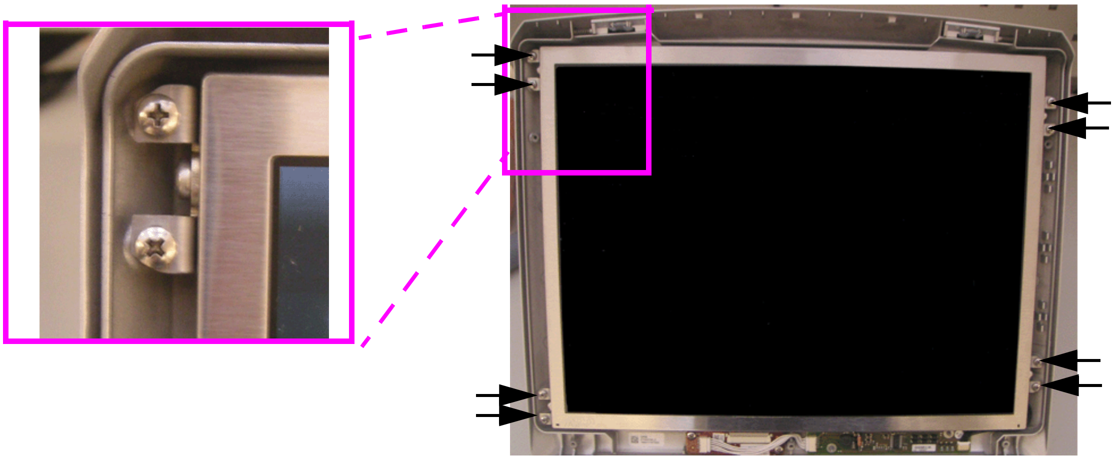


Figure 8-47 remove 8 screws that fasten LCD Display

2.) Disconnect the Microphone (not available with SW 8.1.2 and higher) and the BBDI Inverter cable from the Flex (see: Figure 8-48 below).

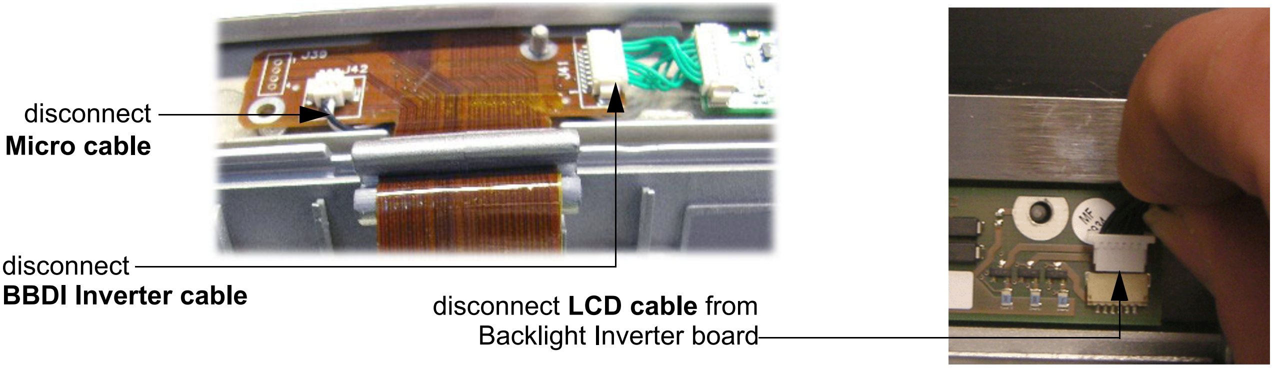

disconnect
Micro cable
disconnect
BBDI Inverter cable
disconnect **LCD cable** from
Backlight Inverter board

Figure 8-48 disconnect cables

3.) Disconnect the LCD Display cable from the Backlight Inverter board (see: Figure 8-48, above).

8-16-4 LCD Display - Removal Procedure (cont'd)

4.) Carefully lift the LCD Display upwards to gain access to the connector underneath. Remove the kapton tape from the LCD rear panel and disconnect and remove the BBDI Rigid Flex.

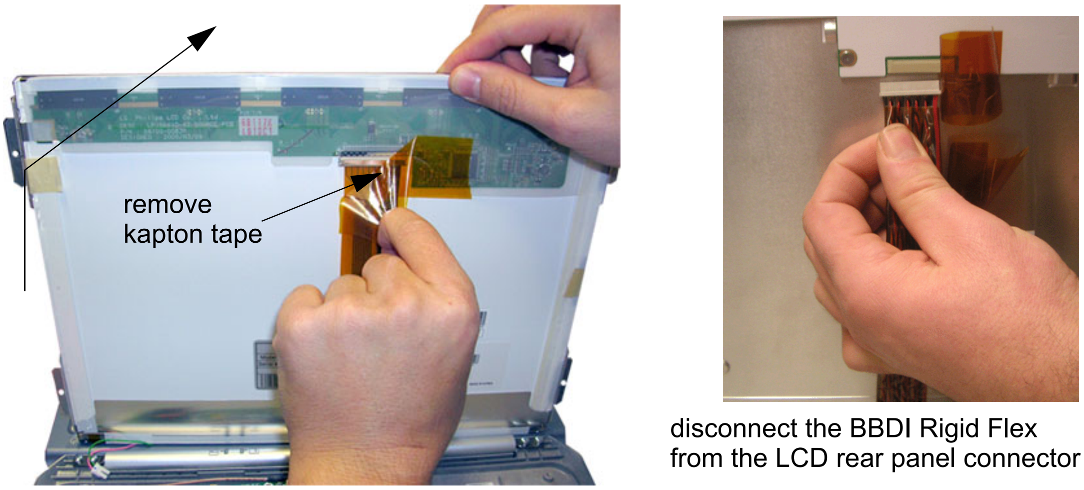

remove
kapton tape
disconnect the BBDI Rigid Flex
from the LCD rear panel connector

Figure 8-49 remove kapton tape and disconnect Rigid Flex

5.) Using both hands, carefully remove the LCD Display from the Rear cover assembly.

6.) Turn the LCD Display to the right/left and remove the 4 screws (2 on each side as shown in Figure 8-50 below) which fixates the aluminium brackets at the LCD Display.

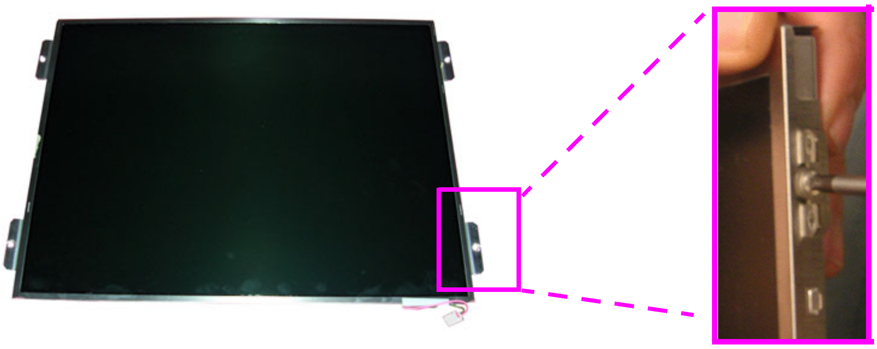


Figure 8-50 remove aluminium brackets by loosen the 8 screws

8-16-5 LCD Display - Installation Procedure

1.) Mount the aluminium brackets (1 screw each) on the new LCD Display (see: Figure 8-50, above).

2.) Connect the BBDI Rigid Flex to the LCD rear panel connector and cover it with the kapton tape; refer to Figure 8-49, above.

3.) Carefully place the LCD Display to its original position. Connect the BBDI Inverter cable, microphone cable (not available with SW 8.1.2 and higher) and the LCD cable as shown in Figure 8-48 on page 8-36.

4.) Check that the LCD Display can be tilted *upwards* and *downwards*, and that it holds its set position.

5.) Mount the LCD Display Frame as described in Section 8-12-5 on page 8-30.

Section 8-17
Replacement of the Display Rear Cover

8-17-1 Manpower

One person, 70 minutes

8-17-2 Tools

Phillips screwdriver 1 and 2

8-17-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) **Disconnect** all external **USB-devices** (e.g., USB printer).
3.) Remove the Battery as described in Section 8-11-4 on page 8-29.
4.) Remove the Handle as described in the Section 8-10-4 on page 8-28.
5.) Remove the Keyboard module as described in Section 8-15-4 on page 8-37.
6.) Remove the LCD Display Frame as described in Section 8-12-4 on page 8-30.
7.) Remove the LCD Display as described in Section 8-16-4 on page 8-36.

8-17-4 Display Rear Cover - Removal Procedure

1.) Carefully disconnect the Inverter cable and the microphone cable (not available with SW 8.1.2 and higher) from the BBDI Rigid Flex.

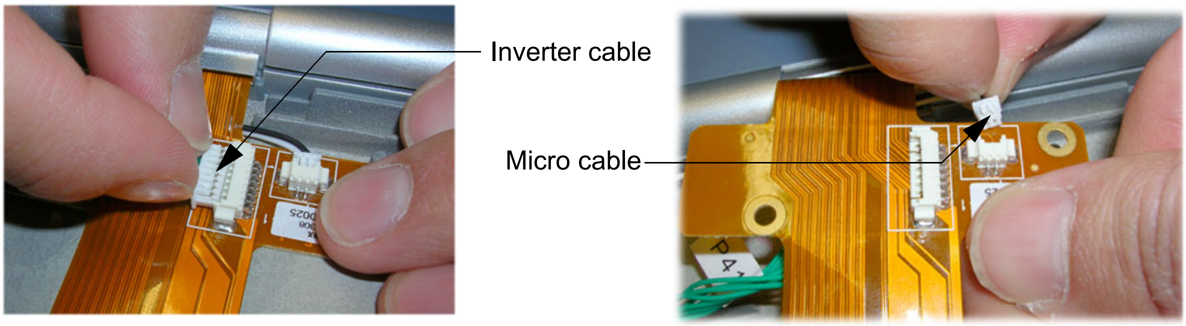


Figure 8-51 disconnect cables from Flex

2.) Remove the Backlight Inverter board from the Rear Cover Assembly.

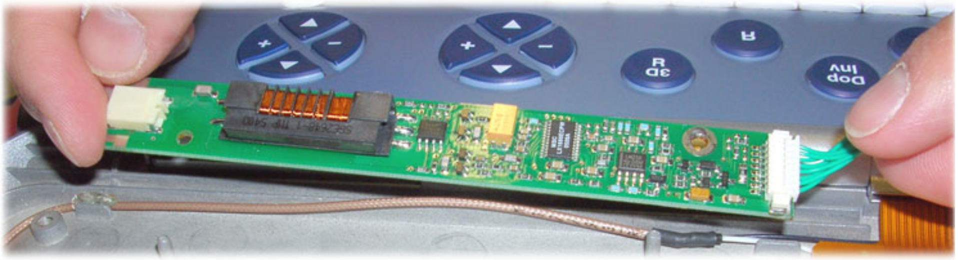


Figure 8-52 remove Backlight Inverter board

8-17-4 Display Rear Cover - Removal Procedure (cont'd)

3.) Loosen and remove the 4 screws (2 on each of the left and right hinges); see: Figure 8-53 below.

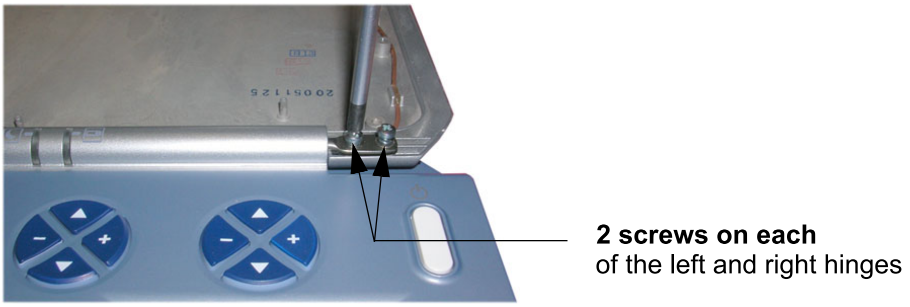


Figure 8-53 loose and remove 4 screws at hinges

4.) Lift the Rear Cover away from the Bottom Assembly.

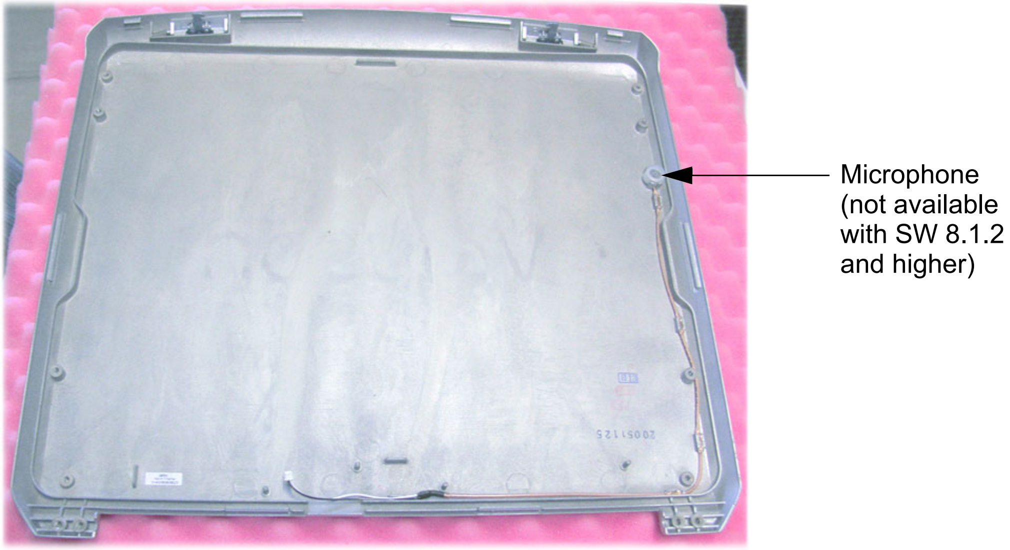


Figure 8-54 Bottom Assembly (incl. Microphone)

8-17-5 Display Rear Cover - Installation Procedure

1.) Place the Rear Cover in position on the Bottom Assembly. Checking that the hinges are properly aligned, fasten the 4 screws (2 on each of the left and right hinges, see: Figure 8-53, above).

2.) Place the Backlight Inverter board in its original position.

3.) Reconnect the Inverter cable and the Micro cable (not available with SW 8.1.2 and higher) to the Flex (refer to Figure 8-51 on page 8-38).

4.) Mount the LCD Display as described in Section 8-16-5 on page 8-37.

5.) Check that the LCD Display can be tilted *upwards* and *downwards*, and that it holds its set position.

6.) Mount the LCD Display Frame as described in Section 8-12-5 on page 8-30.

7.) Mount the keyboard module, the battery, the Handle and reconnect the AC adapter; as described in Section 8-15-5 on page 8-40.

Section 8-18
Replacement of the Modo Cart Components

For quick reference, the Modo Cart component replacement procedures are described in the following sub-sections:

Table 8-2 Optional Peripherals and Accessories - Replacement Parts

Sub-section	Description	Page Number
8-18-1	Replacement of the Probe Holders	8-40
8-18-2	Replacement of the Cable Clips	8-41
8-18-3	Replacement of the Fuses	8-42
8-18-4	Replacement of the Wheels	8-43

8-18-1 Replacement of the Probe Holders

8-18-1-1 Manpower

One person, 5 minutes

8-18-1-2 Tools

none

8-18-1-3 Preparations

none

8-18-1-4 Probe Holder - Removal Procedure

1.) Remove the Probe Holder.

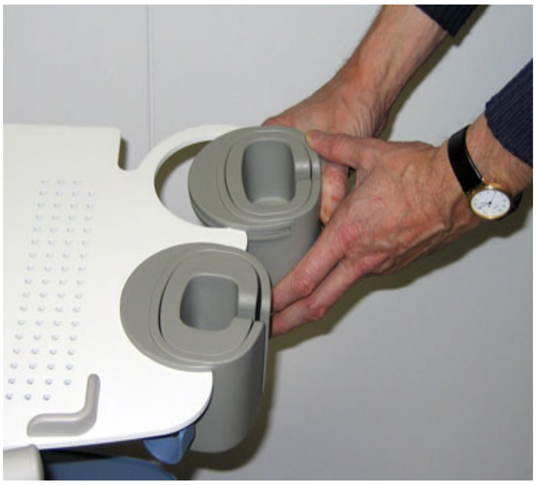


Figure 8-55 Remove the Probe Holder

8-18-1-5 Probe Holder - Installation Procedure

1.) Place the new Probe Holder.

8-18-2 Replacement of the Cable Clips

8-18-2-1 Manpower

One person, 5 minutes

8-18-2-2 Tools

none

8-18-2-3 Preparations

none

8-18-2-4 Cable Clips - Removal Procedure

1.) Pinch together the Cable Clips.

2.) Remove the Cable Clips.

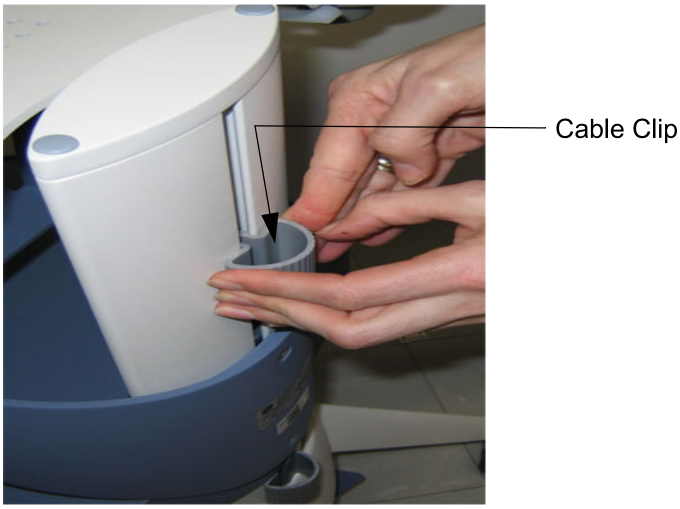


Figure 8-56 Pinch together the Cable Clips

8-18-2-5 Cable Clips - Installation Procedure

1.) Place the new Cable Clips.

8-18-3 Replacement of the Fuses

8-18-3-1 Manpower

One person, 10 minutes

8-18-3-2 Tools

Phillips screwdriver 1 and 2

8-18-3-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72

8-18-3-4 Fuses - Removal Procedure

1.) Open the fuse protection on the rear of the isolation transformer.

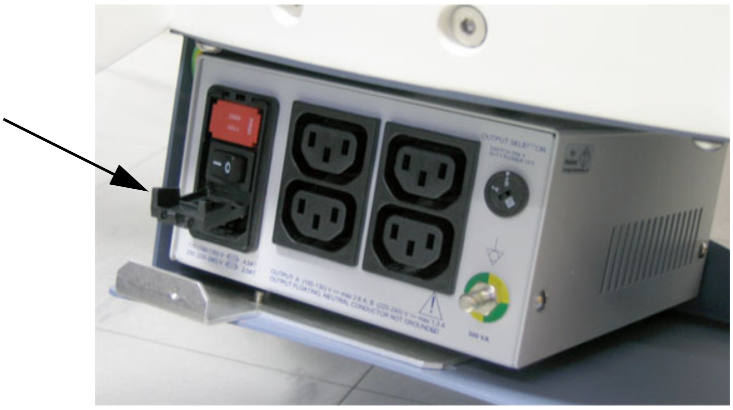


Figure 8-57 open fuse protection on rear of transformer

2.) Pull out the fuse holder and remove the 2 fuses.

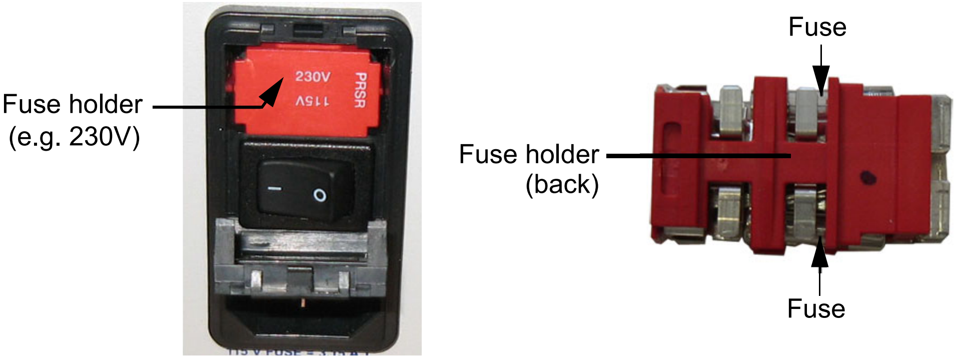


Figure 8-58 change fuses of isolation transformer

8-18-3-5 Fuses - Installation Procedure

1.) Insert 2 new Fuses.

2.) Push the fuse holder back into position (correct voltage should be shown in upper line e.g, 230V, see: Figure 8-58, above) and then close protection.

3.) Reconnect the mains power cable.

8-18-4 Replacement of the Wheels

8-18-4-1 Manpower

Two persons, 20 minutes

8-18-4-2 Tools

flat wrench 19

8-18-4-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72
2.) Put away all Peripherals Cables.
3.) Disconnect all external USB-devices (e.g., USB printer).
4.) With one person one each side of the Modo Cart, hold on to the top and the bottom of the Modo Cart and turn it upside down on a soft ground (e.g. soft foam plastic).

8-18-4-4 Wheels - Removal Procedure

1.) Screw off the Wheels.
2.) Remove the Wheels.

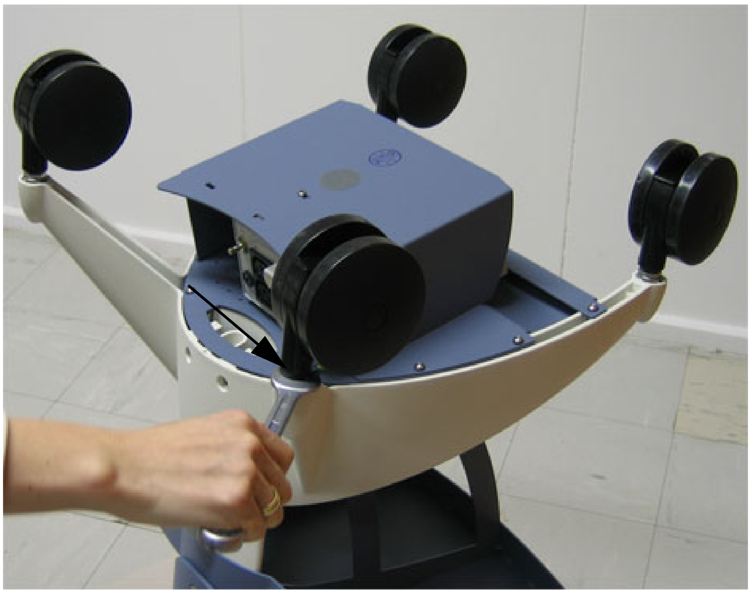


Figure 8-59 Screw off the Wheels

NOTE: *Do not lose the washers.*

8-18-4-5 Wheels - Installation Procedure

1.) Place the new Wheel and fasten it.
2.) With one person one each side turn the Modo Cart upright.

Section 8-19
Replacement of the Dock Cart Components

For quick reference, the Dock Cart component replacement procedures are described in the following sub-sections:

Table 8-3 Optional Peripherals and Accessories - Replacement Parts

Sub-section	Description	Page Number
8-19-1	Replacement of the Probe Holder Kit	8-45
8-19-2	Replacement of the Tray upper	8-46
8-19-3	Replacement of the Tray lower	8-47
8-19-4	Replacement of the Cover Bottom	8-48
8-19-5	Replacement of the Back Column Cover	8-49
8-19-6	Replacement of the Front Column Cover	8-50
8-19-7	Replacement of the Fuses	8-51
8-19-8	Replacement of the Wheels	8-52
8-19-9	Replacement of the Mounting Platform	8-53
8-19-10	Replacement of the Tray Recorder	8-54
8-19-11	Replacement of the Probe Holder for Endocavity probes	8-55
8-19-12	Replacement of the Top Probe Holder	8-56
8-19-13	Replacement of the Probe Mux Box	8-57

8-19-1 Replacement of the Probe Holder Kit

8-19-1-1 Manpower

One person, 5 minutes

8-19-1-2 Tools

none

8-19-1-3 Preparations

none

8-19-1-4 Probe Holder Kit - Removal Procedure

1.) Pinch together the Probe Holders.
2.) Remove the Probe Holders.

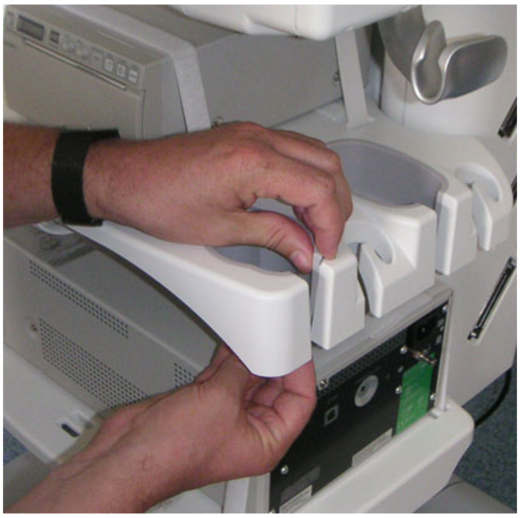


Figure 8-60 remove the Probe Holder

8-19-1-5 Probe Holder Kit - Installation Procedure

1.) Place the new Probe Holder.

8-19-2 Replacement of the Tray upper

8-19-2-1 Manpower

One person, 10 minutes

8-19-2-2 Tools

Phillips screwdriver 1
Allen wrench 5

8-19-2-3 Preparation

1.) Put away all things on the Tray (e.g. Probes)

8-19-2-4 Tray upper - Removal Procedure

1.) Loosen the 4 Allen screws that fasten the Tray upper and carefully remove it.

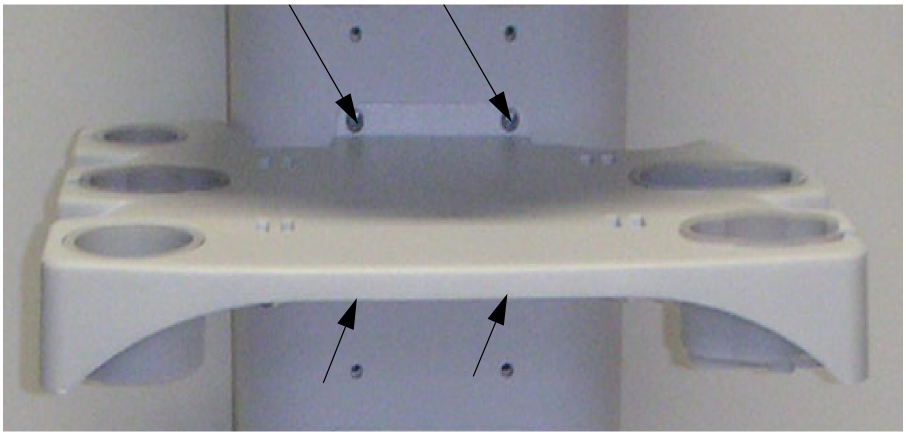


Figure 8-61 screw off the 4 screws

2.) On the back side of the Tray screw off the 6 screws and you have the Trag only.

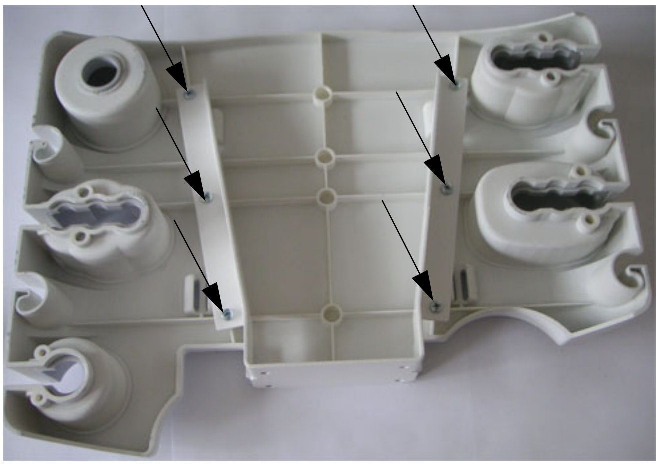


Figure 8-62 screw off the 6 screws

8-19-2-5 Tray upper - Installation Procedure

1.) Place the new Tray and fasten it (see Figure 8-62 on page 8-46 and Figure 8-61 on page 8-46).

8-19-3 Replacement of the Tray lower

8-19-3-1 Manpower

One person, 10 minutes

8-19-3-2 Tools

Phillips screwdriver 1
Allen wrench 5

8-19-3-3 Preparation

1.) Put away all things on the Tray (e.g. Printer).

8-19-3-4 Tray lower - Removal Procedure

1.) Loosen the 4 Allen screws that fasten the Tray lower and carefully remove it.

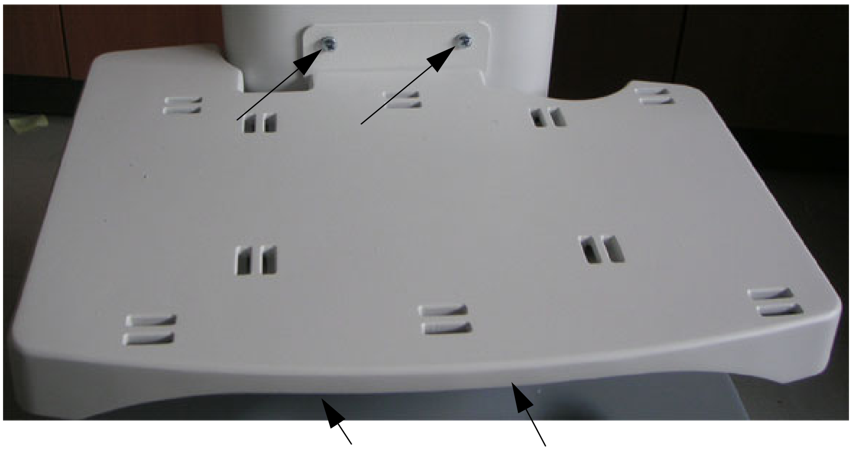


Figure 8-63 screw off the 4 screws

2.) On the back side of the Tray screw off the 6 screws and you have the Tray only.

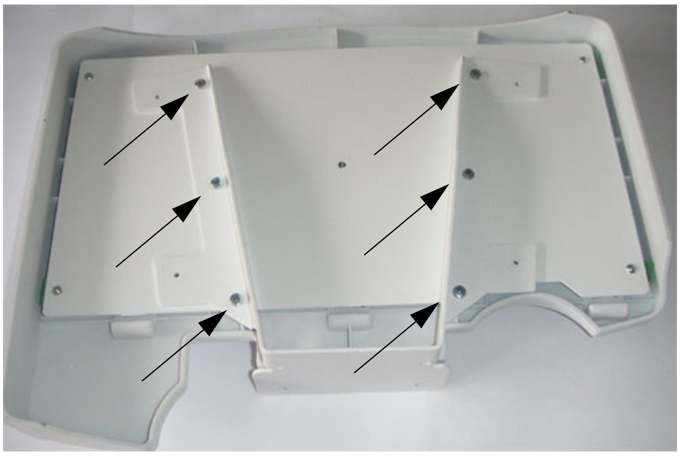


Figure 8-64 screw off the 6 screws

8-19-3-5 Tray lower - Installation Procedure

1.) Place the new Tray and fasten with the 4 Allen screws (as shown in Figure 8-64 on page 8-47 and in Figure 8-63 on page 8-47).

8-19-4 Replacement of the Cover Bottom

8-19-4-1 Manpower

One person, 10 minutes

8-19-4-2 Tools

Phillips screwdriver 1

8-19-4-3 Preparations

none

8-19-4-4 Cover Bottom - Removal Procedure

1.) For unlocking, turn the 2 quick release devices below the Cover Bottom 90°.

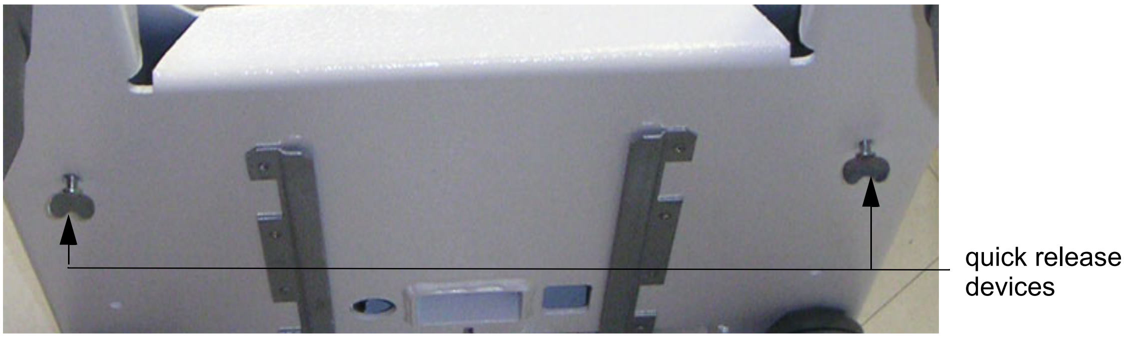


Figure 8-65 turn quick release devices 90°

2.) Remove the Cover Bottom.

3.) Screw off the 2 screws on the back side and remove the Cover Bottom. .

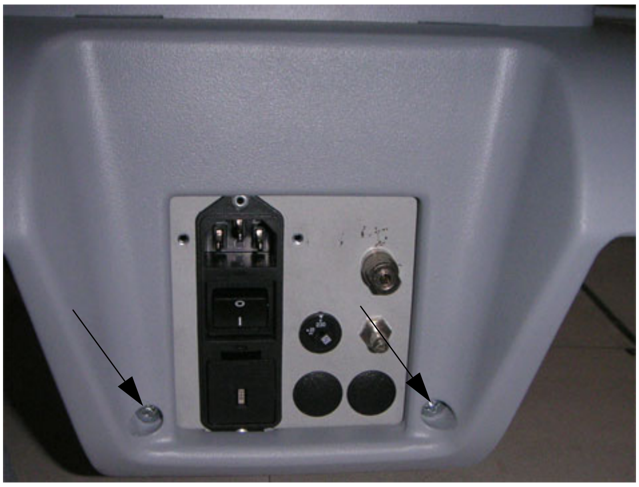


Figure 8-66 screw off the screws on the back side

8-19-4-5 Cover Bottom - Installation Procedure

1.) Place the new Cover Bottom on the original position.

2.) Fasten the 2 screws.

3.) For locking, turn the 2 quick release devices below the Cover Bottom 90°.

8-19-5 Replacement of the Back Column Cover

8-19-5-1 Manpower

One person, 15 minutes

8-19-5-2 Tools

Phillips screwdriver 1

8-19-5-3 Preparations

1.) Remove the Cover Bottom as described in Section 8-19-4 on page 8-48.

8-19-5-4 Back Column Cover - Removal Procedure

1.) Screw off the 4 screws of the white part and carefully remove.
2.) Screw off the 4 screws of the gray part and carefully remove.

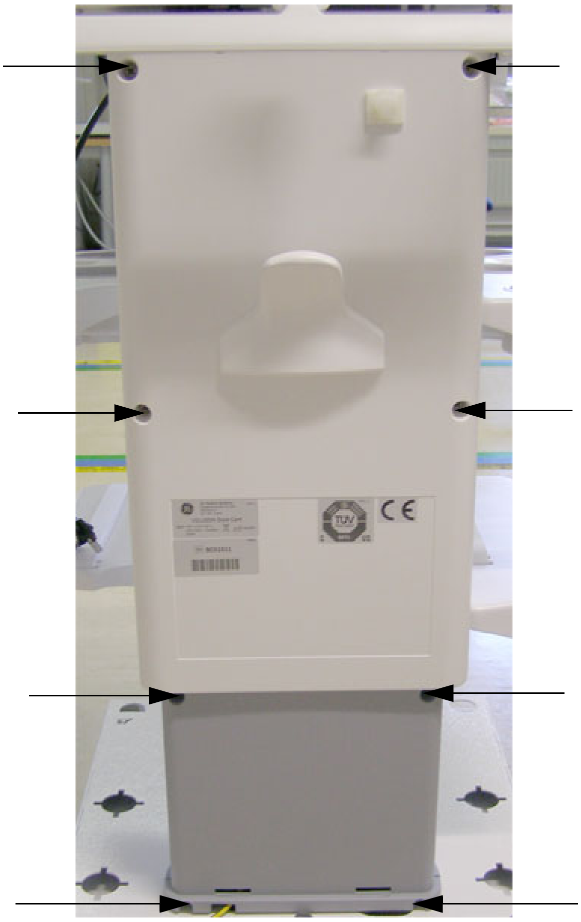


Figure 8-67 screw off the screws

8-19-5-5 Back Column Cover - Installation Procedure

1.) Place the new Back Column Cover and fasten it with the screws.
2.) Mount the Cover Bottom as described in Section 8-19-4-5 on page 8-48.

8-19-6 Replacement of the Front Column Cover

8-19-6-1 Manpower

One person, 20 minutes

8-19-6-2 Tools

Phillips screwdriver 1

8-19-6-3 Preparation

1.) Remove the Tray upper as described in Section 8-19-2 on page 8-46.
2.) Remove the Tray lower as described in Section 8-19-3 on page 8-47.
3.) Remove the Cover Bottom as described in Section 8-19-4 on page 8-48.
4.) Remove the Back Column Cover as described in Section 8-19-5 on page 8-49.

8-19-6-4 Front Column Cover - Removal Procedure

1.) Screw off the 4 screws of the white part and carefully remove them.
2.) Screw off the 2 screws in the front of the gray part and carefully remove them.

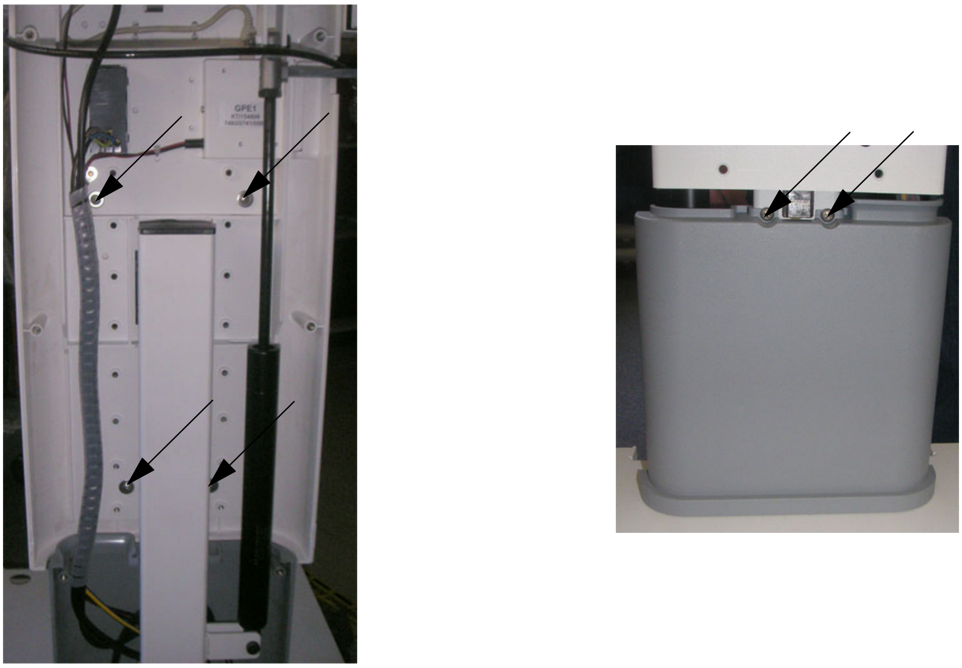


Figure 8-68 screw off the screws

8-19-6-5 Front Column Cover - Installation Procedure

1.) Place the new Front Column Cover and fasten it with the screws.
2.) Mount the Back Column Cover as described in Section 8-19-5-5 on page 8-49.
3.) Mount the Cover Bottom as described in Section 8-19-4-5 on page 8-48.
4.) Mount the Tray lower as described in Section 8-19-3-5 on page 8-47.
5.) Mount the Tray upper as described in Section 8-19-2-5 on page 8-46.

8-19-7 Replacement of the Fuses

NOTE: *Change Main Power Voltage and change fuses of Power Supply is the same procedure for the Power Supply of the Dock Cart and the Power Supply of the Voluson Station.*

8-19-7-1 Manpower

One person, 10 minutes

8-19-7-2 Tools

Phillips screwdriver 1

8-19-7-3 Preparation

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-19-7-4 Fuses - Removal Procedure

1.) Open the fuse protection on the rear of the Power Supply.

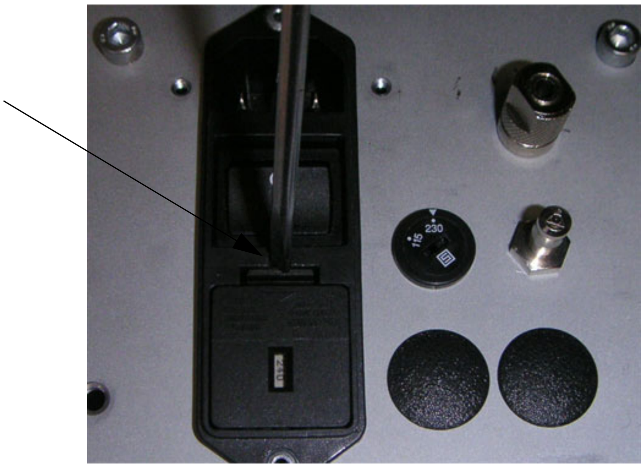


Figure 8-69 opern the fuse protection

2.) Pull out the fuse holder and remove the 2 fuses.

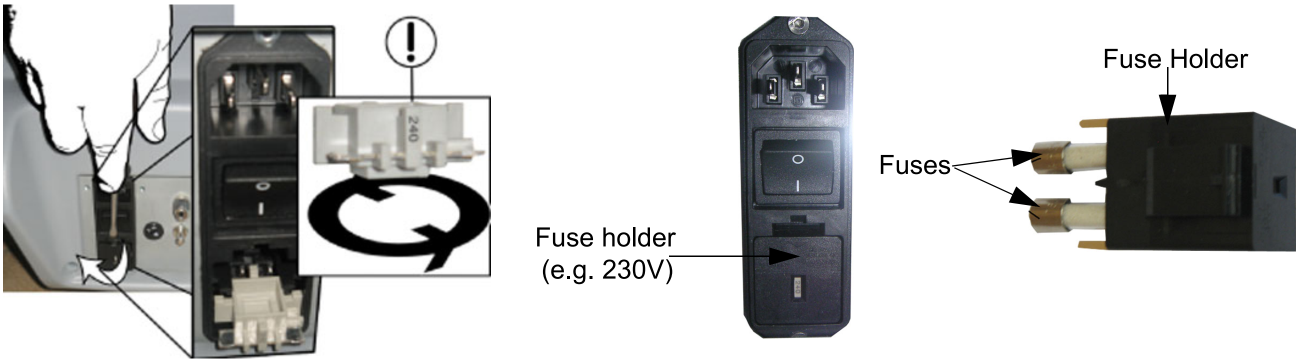


Figure 8-70 change Main Power Voltage / change fuses of power supply

8-19-7-5 Fuses - Installation Procedure

1.) Insert 2 new fuses.

2.) Push the fuse holder back into position (correct voltage should be shown) and then close protection.

8-19-8 Replacement of the Wheels

8-19-8-1 Manpower

Two persons, 20 minutes

8-19-8-2 Tools

flat wrench 19

8-19-8-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Disconnect and remove the Voluson i / Voluson e from the Dock Cart.
3.) Disconnect and remove all external USB-devices (e.g., USB printer).
4.) Remove the Cover Bottom as described in Section 8-19-4 on page 8-48.
5.) With one person one each side of the Dock Cart, hold on to the top and the bottom of the Dock Cart and turn it on the back side of the Dock Cart on a soft ground (e.g. soft foam plastic).

8-19-8-4 Wheels - Removal Procedure

1.) Loosen the nut (wrench size 19) and remove the wheels through the hole.

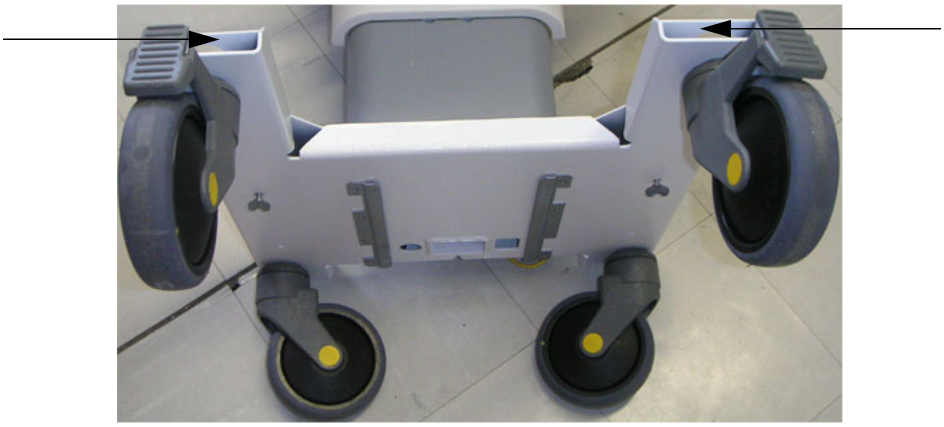


Figure 8-71 screw off the Wheels

8-19-8-5 Wheels - Installation Procedure

1.) Place the new Wheels and fix it with the nut (tighten with high torque).
2.) With one person one each side turn the Dock Cart upright.
3.) Mount the Cover Bottom as described in Section 8-19-4-5 on page 8-48.

8-19-9 Replacement of the Mounting Platform

8-19-9-1 Manpower

One person, 20 minutes

8-19-9-2 Tools

Phillips screwdriver 1
Torx screwdriver TX8

8-19-9-3 Preparation

1.) Power OFF/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Disconnect and remove the Voluson i / Voluson e.

3.) Remove the Cover Bottom as described in Section 8-19-4 on page 8-48.

4.) Remove the Back Column Cover as described in Section 8-19-5 on page 8-49.

8-19-9-4 Mounting Platform - Removal Procedure

1.) Screw off the screw.

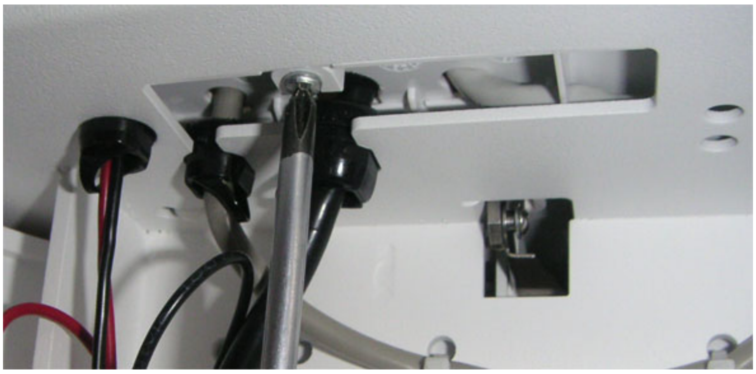


Figure 8-72 unscrew the screw

2.) Screw off the 4 Torx screws.

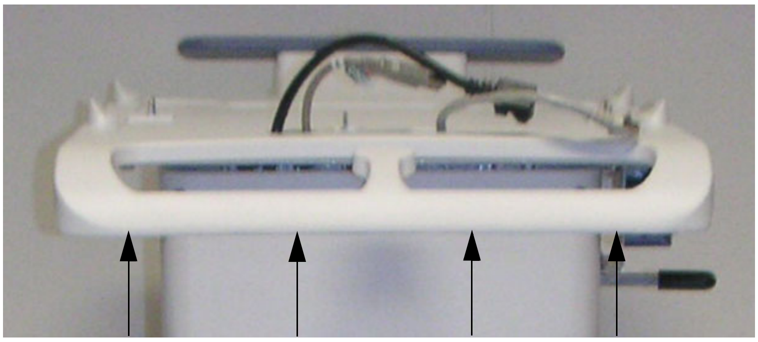


Figure 8-73 unscrew the Torx screws

8-19-9-5 Mounting Platform - Installation Procedure

1.) Place the new Mounting Platform and fasten it with the screws.

2.) Mount the Back Column Cover as described in Section 8-19-5-5 on page 8-49.

3.) Mount the Cover Bottom as described in Section 8-19-4-5 on page 8-48.

8-19-10 Replacement of the Tray Recorder

8-19-10-1 Manpower

One person, 10 minutes

8-19-10-2 Tools

Phillips screwdriver 1

8-19-10-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Disconnect the DVD Recorder/Writer.

8-19-10-4 Tray Recorder - Removal Procedure

1.) Unscrew the 2 screws and carefully remove the Tray Recorder.

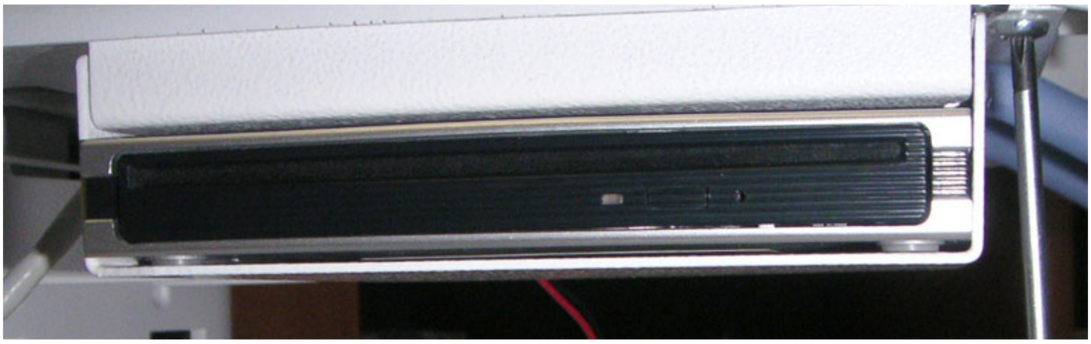


Figure 8-74 unscrew the screws

8-19-10-5 Tray Recorder - Installation Procedure

1.) Place the new Tray Recorder and fasten it with the screws.
2.) Reconnect the DVD Recorder/Writer.

8-19-11 Replacement of the Probe Holder for Endocavity probes

8-19-11-1 Manpower

One person, 5 minutes

8-19-11-2 Tools

Phillips screwdriver 1

8-19-11-3 Preparations

none

8-19-11-4 Probe Holder- Removal Procedure

1.) Screw off the 2 screws and carefully remove the Probe Holder.

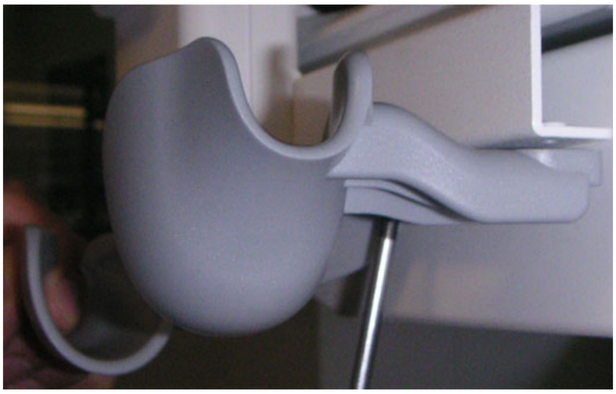


Figure 8-75 screw off the screws

8-19-11-5 Probe Holder- Installation Procedure

1.) Place the new Probe Holder and fasten it with the screws as shown in Figure 8-75 on page 8-55.

8-19-12 Replacement of the Top Probe Holder

8-19-12-1 Manpower

One person, 2 minutes

8-19-12-2 Tools

none

8-19-12-3 Preparations

none

8-19-12-4 Top Probe Holder - Removal Procedure

1.) Carefully pull out the Top Probe Holder.

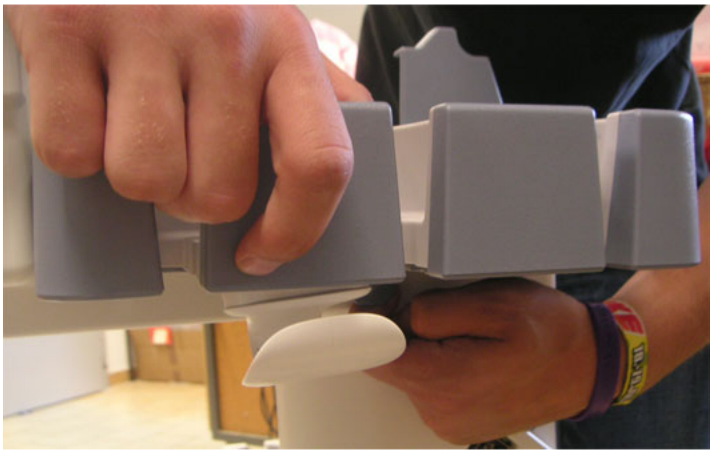


Figure 8-76 pull out the Top Probe Holder

8-19-12-5 Top Probe Holder - Installation Procedure

1.) Place the new Top Probe Holder.

8-19-13 Replacement of the Probe Mux Box

8-19-13-1 Manpower

One person, 10 minutes

8-19-13-2 Tools

Phillips screwdriver 1
Socket wrench 4

8-19-13-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Remove the Probe Holder as described in Section 8-19-11 on page 8-55.

8-19-13-4 Probe Mux Box - Removal Procedure

1.) Disconnect the Probe connector.

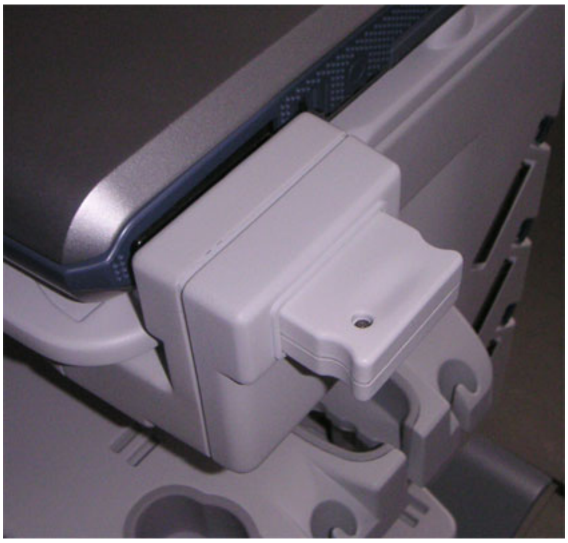


Figure 8-77 disconnect the Probe connector

2.) Hold the Probe box to the Dock Cart.

8-19-13-4 Probe Mux Box - Removal Procedure (cont'd)

3.) Screw off the 2 screws and the 1 Allen screw.

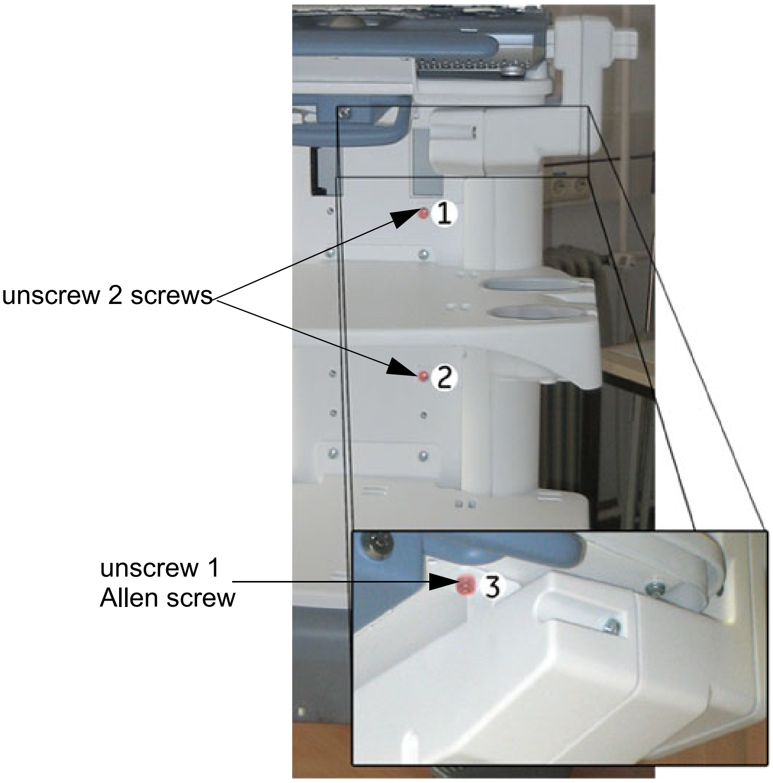


Figure 8-78 unscrew the 2 screws and the 1 Allen screw

4.) With both hands swing the Probe Box out away from the Dock Cart.

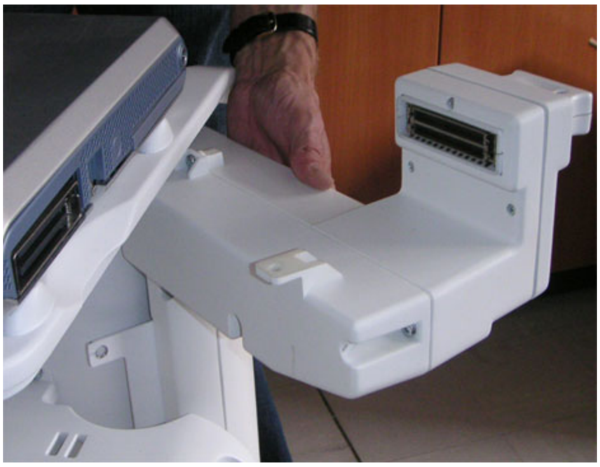


Figure 8-79 carefully remove the Probe Mux Box

8-19-13-5 Probe Mux Box - Installation Procedure

1.) Fasten the Box on the Dock Cart with the screws as shown in Figure 8-78 on page 8-58.

2.) Reconnect the Probe Mux Box as shown in Figure 8-77 on page 8-57.

3.) Mount the Probe Holder as described in Section 8-19-11-5 on page 8-55.

Section 8-20
Replacement of the Voluson Station Components

For quick reference, the Voluson Station component replacement procedures are described in the following sub-sections:

Table 8-4 Optional Peripherals and Accessories - Replacement Parts

Sub-section	Description	Page Number
8-20-1	Replacement of the Cable Holder	8-60
8-20-2	Replacement of the Probe Holder Insert	8-61
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8-20-1 Replacement of the Cable Holder

8-20-1-1 Manpower

One person, 5 minutes

8-20-1-2 Tools

Phillips screwdriver 1

8-20-1-3 Preparations

none

8-20-1-4 Cable Holder - Removal Procedure

1.) Screw off the 2 screws and carefully remove the Cable Holder.

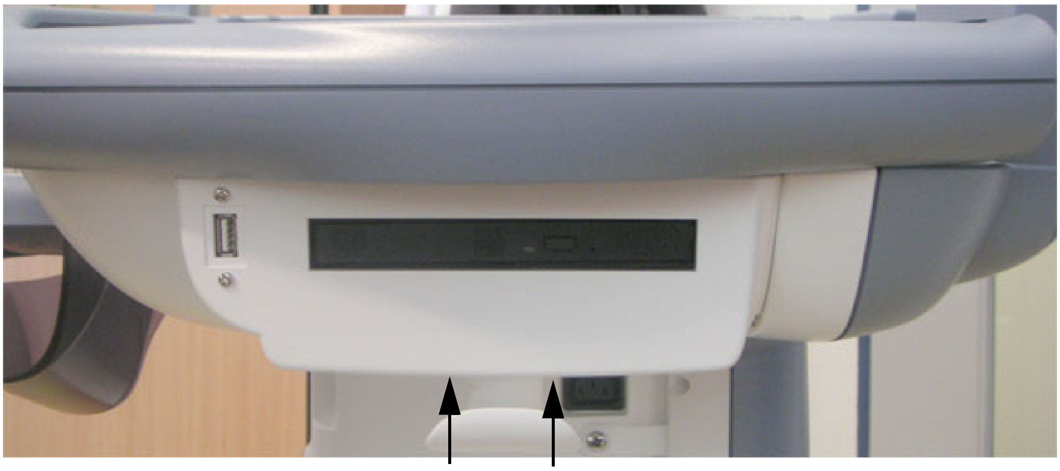


Figure 8-80 remove the Cable Holder

8-20-1-5 Cable Holder - Installation Procedure

1.) Place the new Cable Holder at its original position and fasten it with the 2 screws.

8-20-2 Replacement of the Probe Holder Insert

8-20-2-1 Manpower

One person, 5 minutes

8-20-2-2 Tools

none

8-20-2-3 Preparations

none

8-20-2-4 Probe Holder Insert - Removal Procedure

1.) Pinch together the latches.

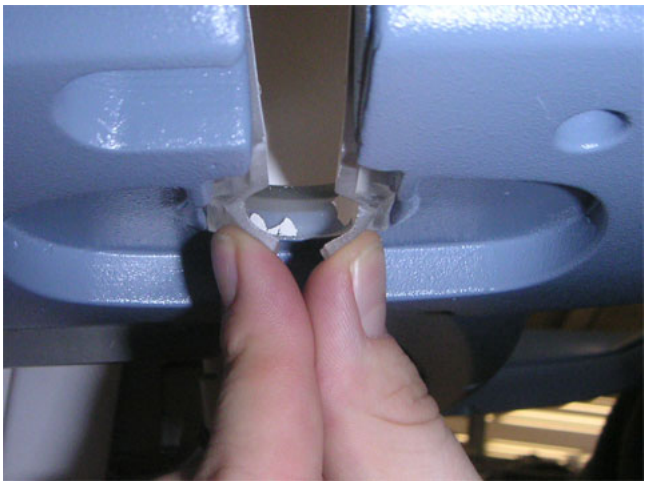


Figure 8-81 pinch together the latches

2.) Remove the Probe Holder Insert.

8-20-2-5 Probe Holder Insert - Installation Procedure

1.) Place the new Probe Holder Insert at its original position.

8-20-3 Replacement of the Storage Tray Back

8-20-3-1 Manpower

One person, 5 minutes

8-20-3-2 Tools

Phillips screwdriver 1

8-20-3-3 Preparations

none

8-20-3-4 Storage Tray Back - Removal Procedure

1.) Screw off the screw and carefully remove the Storage Tray Back.

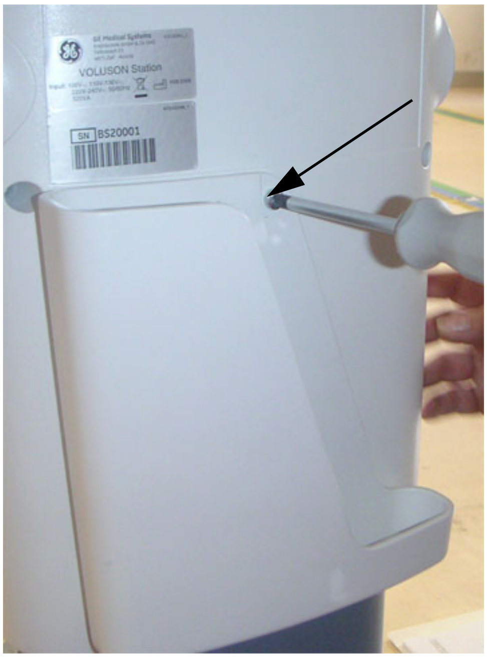


Figure 8-82 screw off the screw

8-20-3-5 Storage Tray Back - Installation Procedure

1.) Place the new Storage Tray Back and fasten the screw.

8-20-4 Replacement of the Gel Condom Holder

8-20-4-1 Manpower

One person, 5 minutes

8-20-4-2 Tools

none

8-20-4-3 Preparations

none

8-20-4-4 Gel Condom Holder - Removal Procedure

1.) Carefully pull out the Gel Condom Holder.

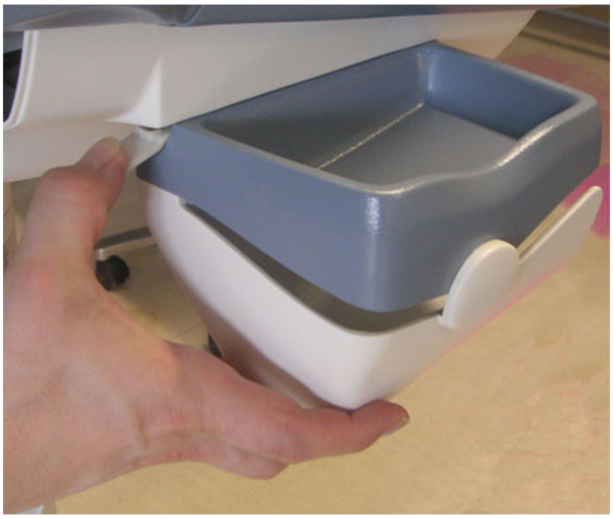


Figure 8-83 pull out the Gel Condom Holder

8-20-4-5 Gel Condom Holder - Installation Procedure

1.) Place the new Gel Condom Holder at its original position.

8-20-5 Replacement of the Probe Holder for Endocavity Probes

8-20-5-1 Manpower

One person, 5 minutes

8-20-5-2 Tools

none

8-20-5-3 Preparations

none

8-20-5-4 Probe Holder - Removal Procedure

1.) Carefully pull out the Probe Holder.

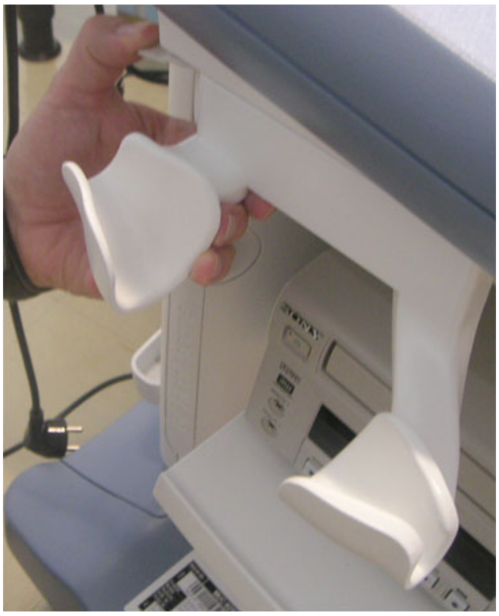


Figure 8-84 pull out the Probe Holder

8-20-5-5 Probe Holder - Installation Procedure

1.) Place the new Probe Holder at its original position.

8-20-6 Replacement of the Additional Shelf Peripherals

8-20-6-1 Manpower

One person, 5 minutes

8-20-6-2 Tools

Phillips screwdriver 1

8-20-6-3 Preparations

1.) Put away all things on the Shelf (e.g. Printer).

8-20-6-4 Additional Shelf Peripherals - Removal Procedure

1.) Screw off the 2 screws and carefully remove it.

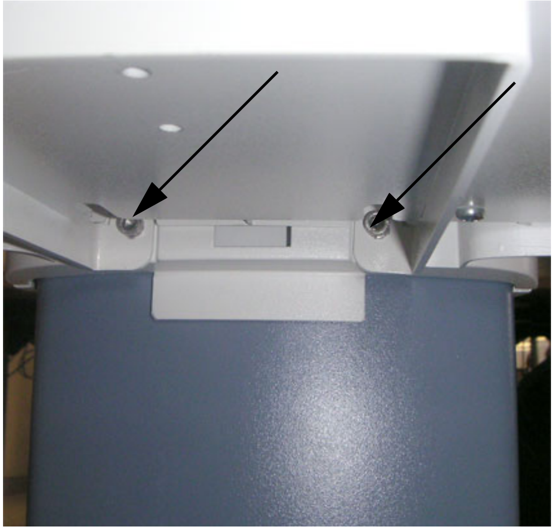


Figure 8-85 screw off the 2 screws

8-20-6-5 Additional Shelf Peripherals - Installation Procedure

1.) Place the new Shelf and fasten with the 2 screws.

8-20-7 Replacement of the Cover BW Printer Shelf

8-20-7-1 Manpower

One person, 5 minutes

8-20-7-2 Tools

Phillips screwdriver 1

8-20-7-3 Preparations

none

8-20-7-4 Cover BW Printer Shelf - Removal Procedure

1.) Align tab on the front of the Printer Shelf Cover with the slot in front of the Printer Shelf; pull out.

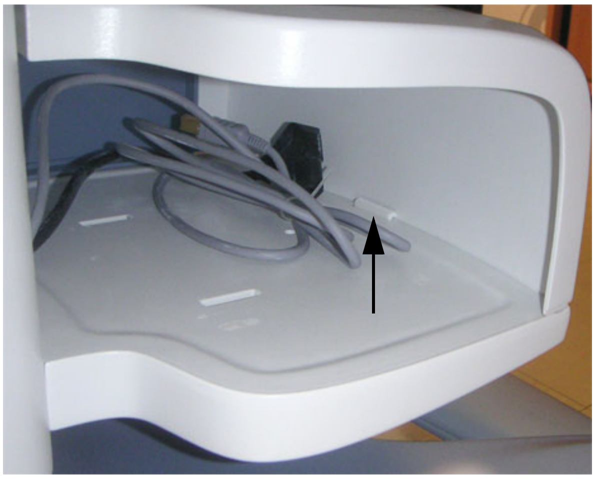


Figure 8-86 pull out the Cover

8-20-7-5 Cover BW Printer Shelf - Installation Procedure

1.) Align tab on the front of the Printer Shelf Cover with the slot in front of the Printer Shelf; press down and snap into place.

8-20-8 Replacement of the Console Bottom Shelf

8-20-8-1 Manpower

Oner person, 10 minutes

8-20-8-2 Tools

Phillips screwdriver 1

8-20-8-3 Preparations

1.) Remove the Printer.

2.) Remove the Cover BW Printer Shelf as described in Section 8-20-7 on page 8-66.

8-20-8-4 Console Bottom Shelf - Removal Procedure

1.) Screw off the 2 screws and carefully remove it.

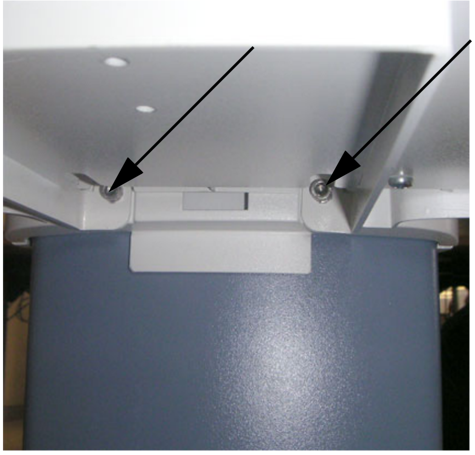


Figure 8-87 screw off the 2 screws

8-20-8-5 Console Bottom Shelf - Installation Procedure

1.) Place the new Shelf and fasten with the 2 screws.

2.) Mount the Cover BW Printer Shelf as described in Section 8-20-7-5 on page 8-66.

8-20-9 Replacement of the optional Probe Mux Box

8-20-9-1 Manpower

One person, 5 minutes

8-20-9-2 Tools

Phillips screwdriver 1

8-20-9-3 Preparation

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the Voluson i / Voluson e from the Tray.

8-20-9-4 Probe Mux Box - Removal Procedure

1.) Disconnect the Probe connector.

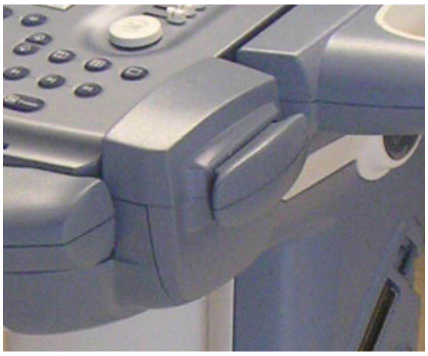


Figure 8-88 disconnect the Probe connector

2.) Hold the Probe box and screw off the 4 screws.

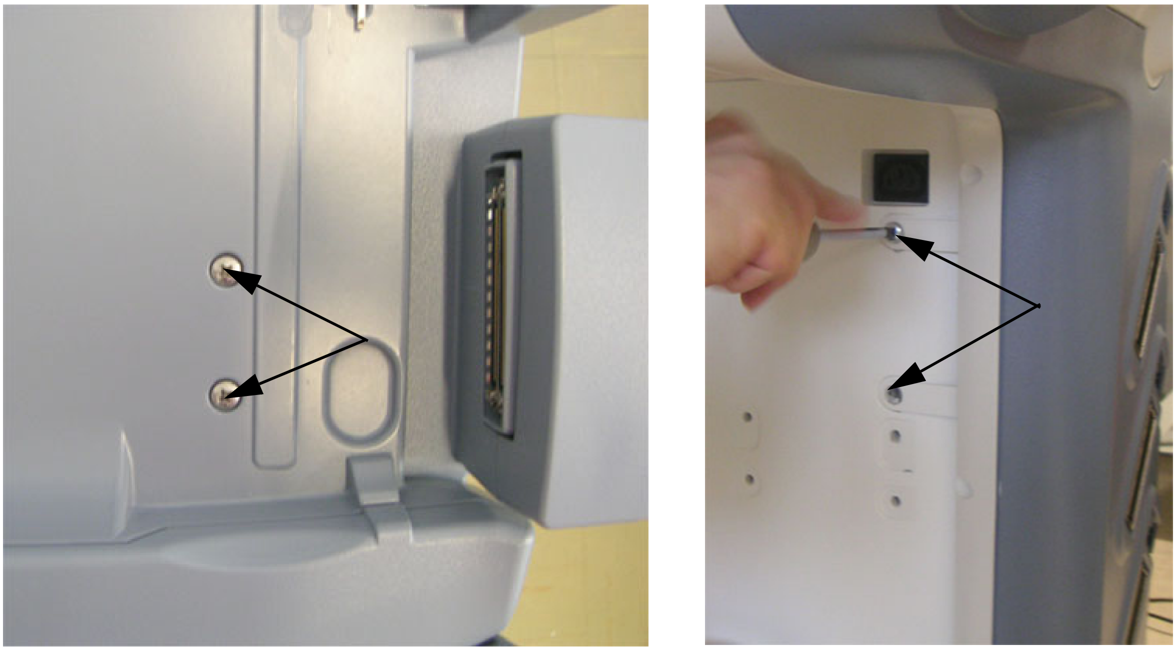


Figure 8-89 unscrew the 4 screws

8-20-9-4 Probe Mux Box - Removal Procedure (cont'd)

3.) With both hands swing the Probe Box out away from the Voluson Station.

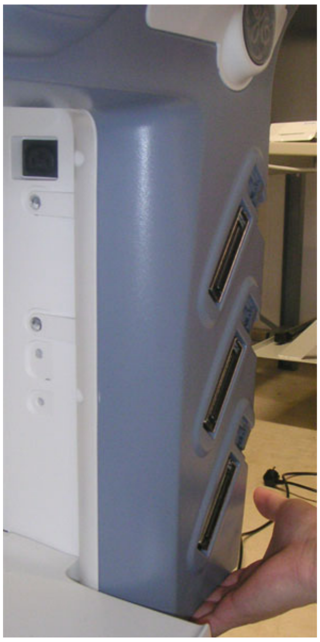


Figure 8-90 carefully remove the Probe Box

8-20-9-5 Probe Mux Box - Installation Procedure

4.) Fasten the Box on the Voluson Station with the screws as shown in Figure 8-89 on page 8-68.

5.) Reconnect the Probe Box as shown in Figure 8-88 on page 8-68.

8-20-10 Replacement of the Patient Monitor

8-20-10-1 Manpower

One person, 5 minutes

8-20-10-2 Tools

Phillips screwdriver 1

8-20-10-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-20-10-4 Patient Monitor - Removal Procedure

1.) Carefully pull out the Patient Monitor.

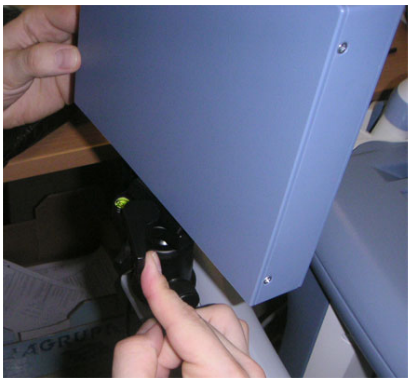


Figure 8-91 pull out the Patient Monitor

2.) Screw off the head plate of the tripot from the Patient Monitor.

3.) Screw off the tripod from the Adapter.

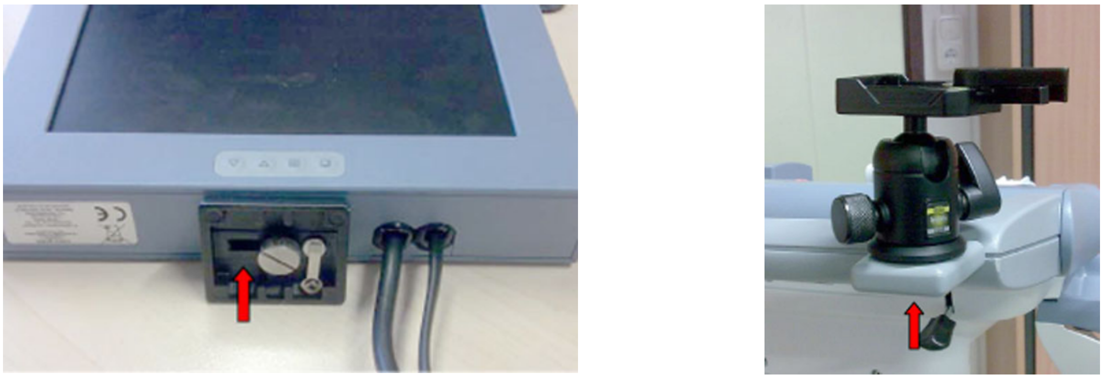


Figure 8-92 screw off the head plate / screw off the tripod

4.) Screw out 2 screws on the Back Handle and remove the Adapters.

8-20-10-5 Patient Monitor - Installation Procedure

5.) Insert the right and the left Adapter and fix it with the 2 screws.

6.) Fix the tripod with a thumbscrew on the Adapter (see Figure 8-92 on page 8-70).

7.) Fix the head plate from the tripod with a screw on the monitor (see Figure 8-92 on page 8-70).

8.) Place the new Patient Monitor at its original position (see Figure 8-91 on page 8-70).

8-20-11 Replacement of the Cover Bottom Voluson Station

8-20-11-1 Manpower

One person, 10 minutes

8-20-11-2 Tools

Phillips screwdriver 1

8-20-11-3 Preparations

none

8-20-11-4 Cover Bottom - Removal Procedure

1.) Slide the Power Supply Bottom Cover backward and it will drop down.

2.) For unlocking, turn the 3 quick release devices below the Base Cover Assy 90°.

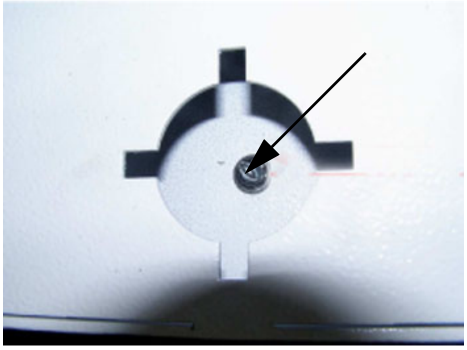


Figure 8-93 turn quick release devices 90°

3.) Screw off the 2 screws and tilt the Bottom Cover out and up to release tabs at the top of the Cover.

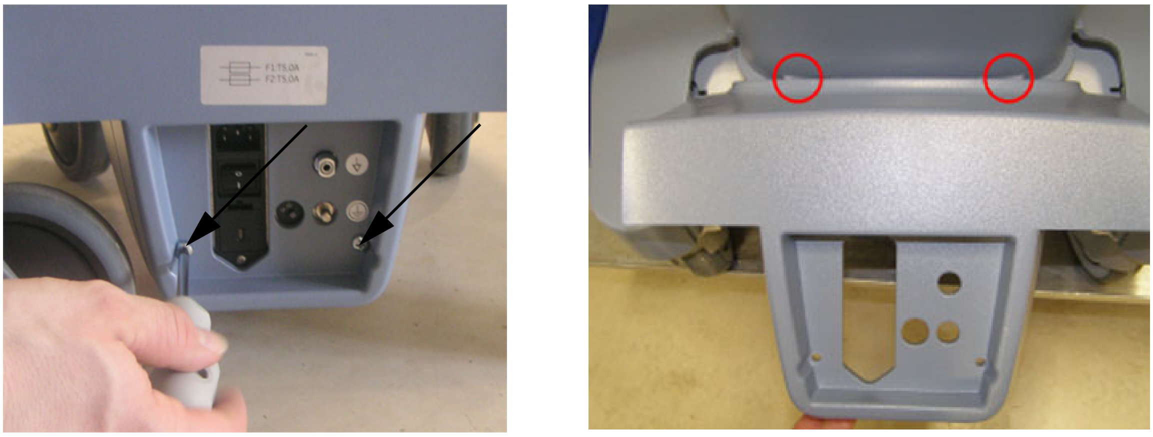


Figure 8-94 screw off the 2 screws and carefully remove it

8-20-11-5 Cover Bottom - Installation Procedure

1.) Place the new Base Cover Assy at the original position.

2.) For locking, turn the 3 quick release devices below the Base Cover Assy 90°.

3.) Place the new Power Supply Cover and fasten with the 2 screws.

8-20-12 Replacement of the Top Shelf Additional Bottom Cover

8-20-12-1 Manpower

One person, 5 minutes

8-20-12-2 Tools

Phillips screwdriver 1

8-20-12-3 Preparations

none

8-20-12-4 Top Shelf Additional Bottom Cover - Removal Procedure

1.) Screw off the 4 screws and carefully remove it.

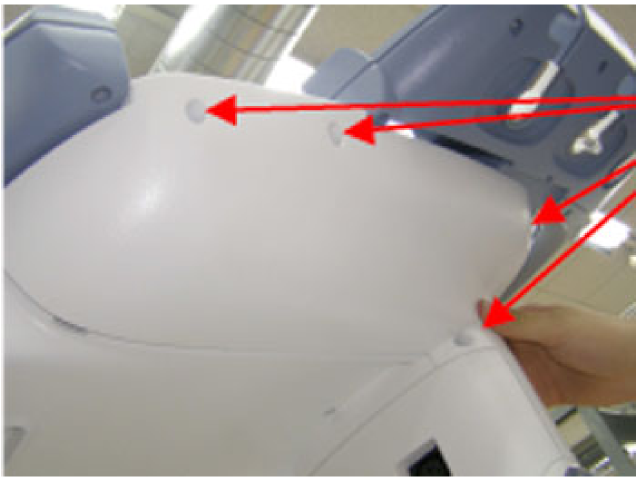


Figure 8-95 screw off the 5 screws

8-20-12-5 Top Shelf Additional Bottom Cover - Installation Procedure

1.) Place the new Top Shelf Additional Bottom Cover and fasten it with the 4 screws.

8-20-13 Replacement of the Top Shelf Bottom Rear Cover

8-20-13-1 Manpower

One person, 10 minutes

8-20-13-2 Tools

Phillips screwdriver 1

8-20-13-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-20-13-4 Top Shelf Bottom Rear Cover - Removal Procedure

1.) Put away the lever complete.

2.) Screw off the 5 screws and carefully remove the Top Shelf Bottom Rear Cover.

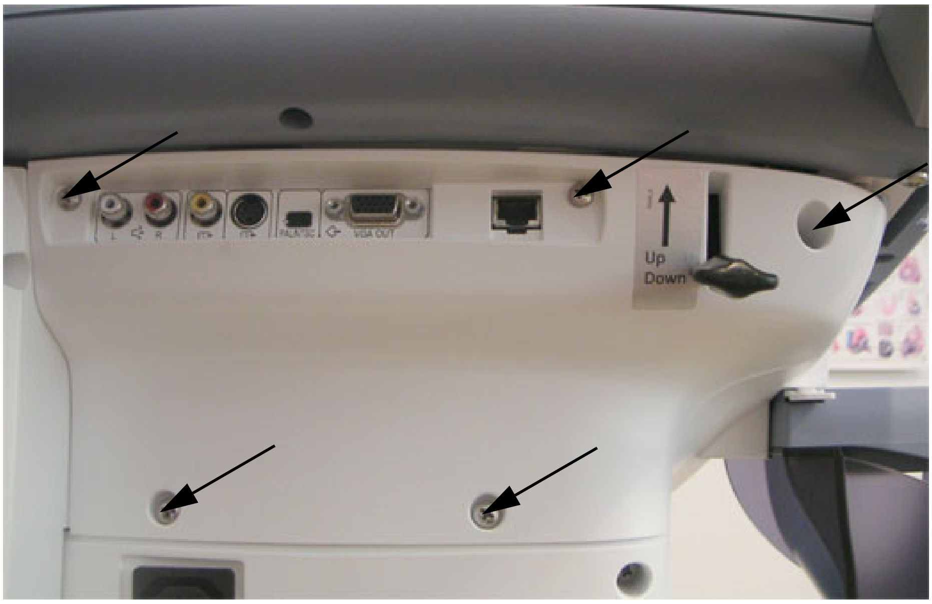


Figure 8-96 unscrew the 5 screws

8-20-13-5 Top Shelf Bottom Rear Cover - Installation Procedure

1.) Place the new Top Shelf Bottom Rear Cover and fasten it with the 5 screws.

2.) Place the complete lever at its original position.

8-20-14 Replacement of the Top Column Back Cover

8-20-14-1 Manpower

One person, 15 minutes

8-20-14-2 Tools

Phillips screwdriver 1

8-20-14-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
3.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.

8-20-14-4 Top Column Back Cover - Removal Procedure

1.) Screw off the 4 screws and disconnect the power cable.

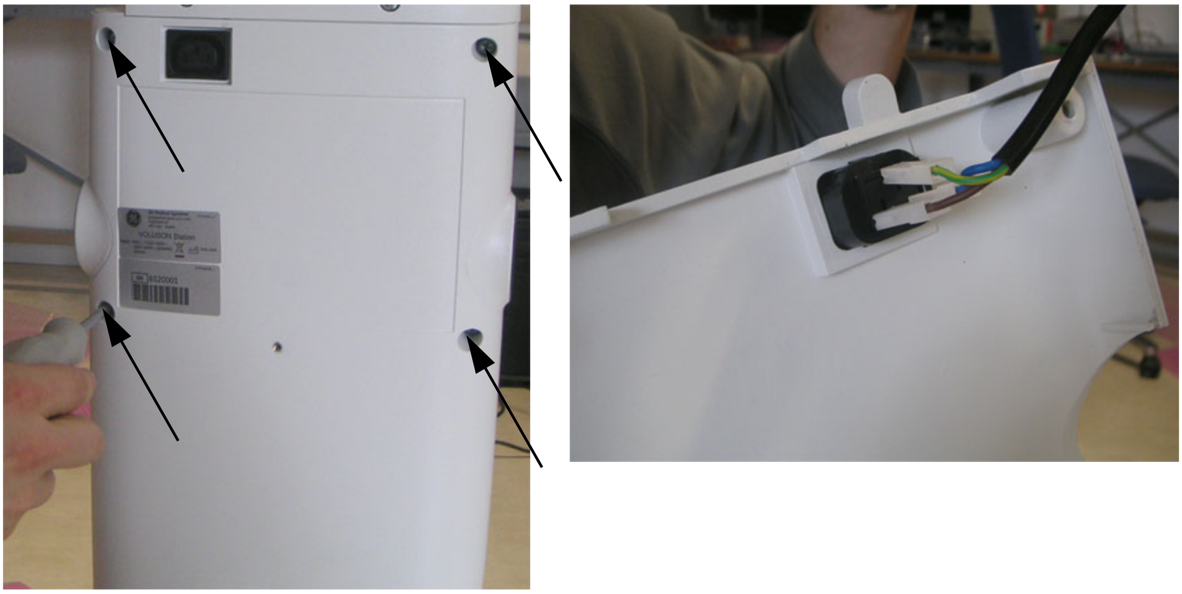


Figure 8-97 unscrew the 4 screws / disconnect the power cable

2.) Carefully remove the Top Column Back Cover.

8-20-14-5 Top Column Back Cover - Installation Procedure

1.) Place the new Top Column Back Cover, connect the power cable and fasten it with the 4 screws.
2.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
3.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.

8-20-15 Replacement of the Bottom Column Back Cover

8-20-15-1 Manpower

Oner person, 15 minutes

8-20-15-2 Tools

Phillips screwdriver 1

8-20-15-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the Storage Tray Back as described in Section 8-20-3 on page 8-62.
3.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
4.) Remove the Power Supply Cover as described in Section 8-20-11 on page 8-71.
5.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.
6.) Remove the Top Column Back Cover as described in Section 8-20-14 on page 8-74.

8-20-15-4 Bottom Column Back Cover - Removal Procedure

1.) Screw off the 4 screws and carefully remove the Bottom Column Back Cover.

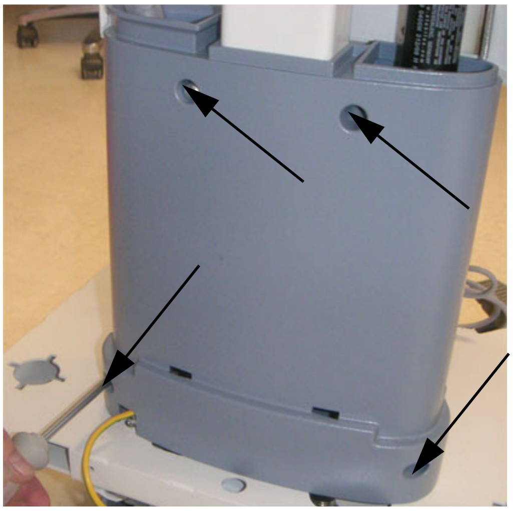


Figure 8-98 unscrew the 4 screws

8-20-15-5 Bottom Column Back Cover - Installation Procedure

1.) Place the new Bottom Column Back Cover and fasten it with the 4 screws.
2.) Mount the Top Column Back Cover as described in Section 8-20-14-5 on page 8-74.
3.) Mount the Power Supply Cover as described in Section 8-20-11-5 on page 8-71.
4.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
5.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.
6.) Mount Storage Tray Back as described in Section 8-20-3-5 on page 8-62.

8-20-16 Replacement of the Column Label Cover

8-20-16-1 Manpower

One person, 15 minutes

8-20-16-2 Tools

Phillips screwdriver 1

8-20-16-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
3.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.
4.) Remove the Top Column Back Cover as descibed in Section 8-20-14 on page 8-74.

8-20-16-4 Column Label Cover - Removal Procedure

1.) Carefully remove the Column Label Cover.

8-20-16-5 Column Label Cover - Installation Procedure

1.) Place the new Column Label Cover.
2.) Mount the Top Column Back Cover as descibed in Section 8-20-14-5 on page 8-74.
3.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
4.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.

8-20-17 Replacement of the Top Column Front Cover

8-20-17-1 Manpower

One person, 20 minutes

8-20-17-2 Tools

Phillips screwdriver 1

8-20-17-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the optional Additional Shelf Peripherals as described in Section 8-20-6 on page 8-65.
3.) Remove the optional Cover BW Printer Shelf as described in Section 8-20-7 on page 8-66.
4.) Remove the optional Console Bottom Shelf as described in Section 8-20-8 on page 8-67.
5.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
6.) Remove the Power Supply Cover as described in Section 8-20-11 on page 8-71.
7.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.
8.) Remove the Top Column Back Cover as descibed in Section 8-20-14 on page 8-74.
9.) Remove the Bottom Column Back Cover as described in Section 8-20-15 on page 8-75.

8-20-17-4 Top Column Front Cover - Removal Procedure

1.) Screw off the 4 screws and carefully remove it.

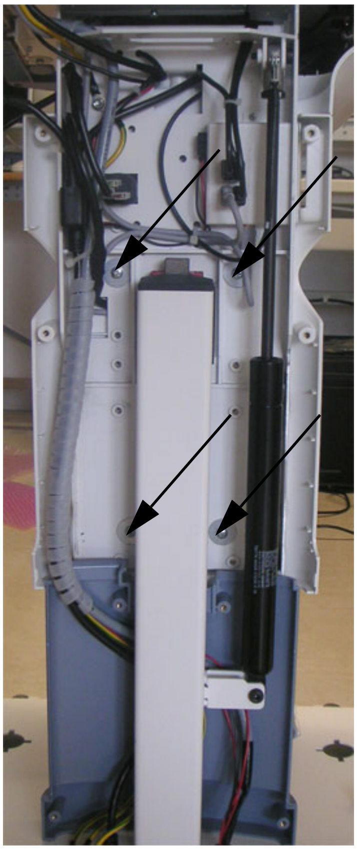


Figure 8-99 unscrew the 4 screws

8-20-17-5 Top Column Front Cover - Installation Procedure

1.) Place the new Top Column Front Cover and fasten it with the 4 screws.
2.) Mount the Bottom Column Back Cover as described in Section 8-20-15-5 on page 8-75.
3.) Mount the Top Column Back Cover as descibed in Section 8-20-14-5 on page 8-74.
4.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
5.) Mount the Power Supply Cover as described in Section 8-20-11-5 on page 8-71.
6.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.
7.) Mount the optional Console Bottom Shelf as described in Section 8-20-8-5 on page 8-67.
8.) Mount the optional Cover BW Printer Shelf as described in Section 8-20-7-5 on page 8-66.
9.) Mount the optional Additional Shelf Peripherals as described in Section 8-20-6-5 on page 8-65

8-20-18 Replacement of the Bottom Column Front Cover

8-20-18-1 Manpower

One person, 20 minutes

8-20-18-2 Tools

Phillips screwdriver 1

8-20-18-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the optional Additional Shelf Peripherals as described in Section 8-20-6 on page 8-65.
3.) Remove the optional Cover BW Printer Shelf as described in Section 8-20-7 on page 8-66.
4.) Remove the optional Console Bottom Shelf as described in Section 8-20-8 on page 8-67.
5.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
6.) Remove the Power Supply Cover as described in Section 8-20-11 on page 8-71.
7.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.
8.) Remove the Top Column Back Cover as descibed in Section 8-20-14 on page 8-74.
9.) Remove the Bottom Column Back Cover as described in Section 8-20-15 on page 8-75.
10.)Remove the Top Column Front Cover as described in Section 8-20-17 on page 8-77.

8-20-18-4 Bottom Column Front Cover - Removal Procedure

1.) Screw off 2 screws from the front top of the Bottom Column Front Cover and carefully remove it.

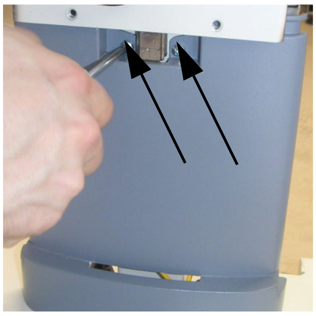


Figure 8-100 unscrew the 2 screws

8-20-18-5 Bottom Column Front Cover - Installation Procedure

1.) Place the new Bottom Column Front Cover and fasten it with the 2 screws.
2.) Mount the Top Column Front Cover as described in Section 8-20-17-5 on page 8-78.
3.) Mount the Bottom Column Back Cover as described in Section 8-20-15-5 on page 8-75.
4.) Mount the Top Column Back Cover as descibed in Section 8-20-14-5 on page 8-74.
5.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
6.) Mount the Power Supply Cover as described in Section 8-20-11-5 on page 8-71.
7.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.
8.) Mount the optional Console Bottom Shelf as described in Section 8-20-8-5 on page 8-67.
9.) Mount the optional Cover BW Printer Shelf as described in Section 8-20-7-5 on page 8-66.
10.)Mount the optional Additional Shelf Peripherals as described in Section 8-20-6-5 on page 8-65.

8-20-19 Replacement of the Top Shelf Bottom Front Cover

8-20-19-1 Manpower

One person, 10 minutes

8-20-19-2 Tools

Phillips screwdriver 1

8-20-19-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Remove the Gel Condom Holder as described in Section 8-20-4 on page 8-63 or remove he optional Probe Holder for Endocavity Probes as described in Section 8-20-5 on page 8-64.

8-20-19-4 Top Shelf Bottom Front Cover - Removal Procedure

1.) Screw off the 5 screws around the Top Shelf Bottom Front Cover.

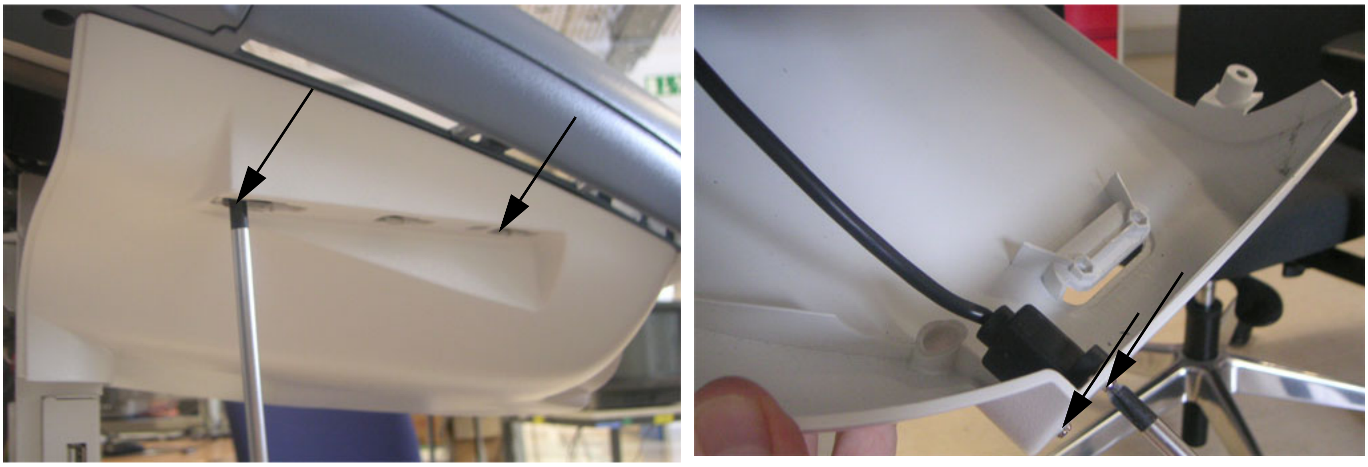


Figure 8-101 unscrew the screws

2.) Screw off the 2 screws by the USB port.

8-20-19-5 Top Shelf Bottom Front Cover - Installation Procedure

1.) Place the new Top Shelf Bottom Front Cover, fasten the 2 screws of the USB-port and fasten the 5 screws around it.

2.) Mount the Gel Condom Holder as described in Section 8-20-4-5 on page 8-63 or mount the optional Probe Holder for Endocavity Probes as described in Section 8-20-5-5 on page 8-64.

8-20-20 Replacement of the Front and Rear Wheels

8-20-20-1 Manpower

Two person, 20 minutes

8-20-20-2 Tools

flat wrench 19

8-20-20-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Disconnect and remove the Voluson i / Voluson e from the Voluson Station.
3.) Disconnect and remove all external USB-devices (e.g. USB-printer).
4.) Remove the Cover Bottom as described in Section 8-20-11 on page 8-71.
5.) With one person one each side of the Voluson Station, hold on to the top and the bottom of the Voluson Station and turn it on the back side of the Station on a soft ground (e.g. soft foam plastic).

8-20-20-4 Wheels - Removal Procedure

1.) Loosen the nut (wrench size 19) and remove the wheels through the hole.

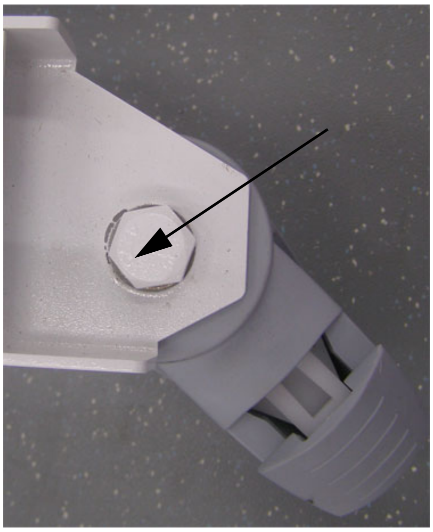


Figure 8-102 screw off the Wheels

8-20-20-5 Wheels - Installation Procedure

1.) Place the new Wheels and fix it with the nut (tighten with high torque).
2.) With one person one each side turn the Voluson Station upright.
3.) Mount the Cover Bottom as described in Section 8-20-11-5 on page 8-71.

8-20-21 Replacement of the Back Handle complete

8-20-21-1 Manpower

One person, 10 minutes

8-20-21-2 Tools

Phillips screwdriver 1

8-20-21-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Remove the Patient Monitor as described in Section 8-20-10 on page 8-70.

8-20-21-4 Back Handle - Removal Procedure

1.) Screw off the 5 screws and carefully remove the Top and Bottom Back Handle.

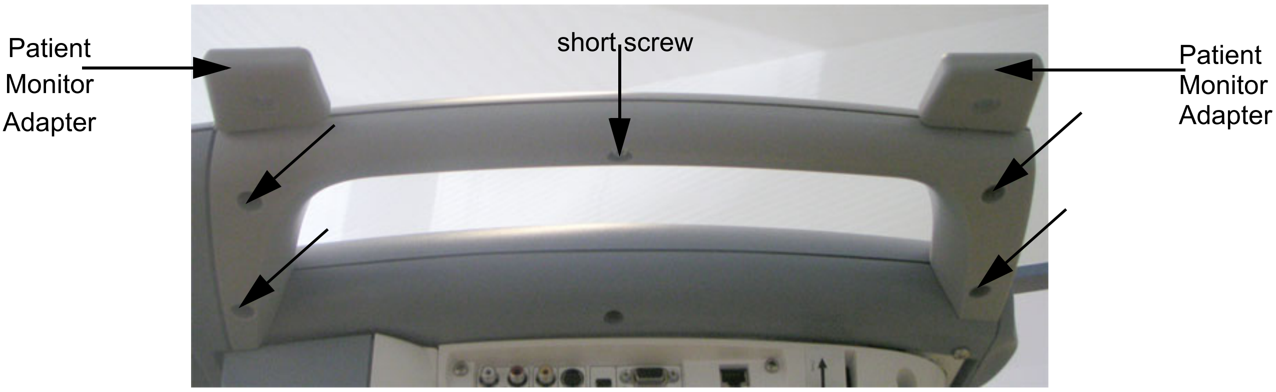


Figure 8-103 screw off the 5 screws

NOTE: *Do not lose the Patient Monitor Adapter !*

8-20-21-5 Back Handle - Installation Procedure

1.) Place the new Back Handle on its original position and also the Patient Monitor Adapter.

2.) Fasten it with the 5 screws.

3.) Mount the Patient Monitor as described in Section 8-20-10-5 on page 8-70.

8-20-22 Replacement of the Power Supply Patient Monitor

8-20-22-1 Manpower

One person, 5 minutes

8-20-22-2 Tools

none

8-20-22-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

8-20-22-4 Power Supply Patient Monitor - Removal Procedure

1.) Disconnect the Power Supply on the rear side of the Voluson Station.

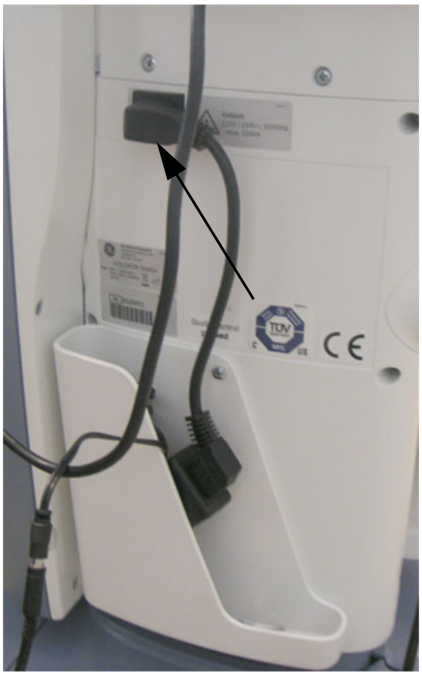


Figure 8-104 disconnect the Power Supply

8-20-22-5 Power Supply Patient Monitor - Installation Procedure

1.) Connect the new Power Supply.

8-20-23 Replacement of the Image Resizer Box

8-20-23-1 Manpower

One person, 10 minutes

8-20-23-2 Tools

Phillips screwdriver 1

8-20-23-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the complete lever.
3.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.

8-20-23-4 Image Resizer Box - Removal Procedure

1.) Screw off 1 screw.

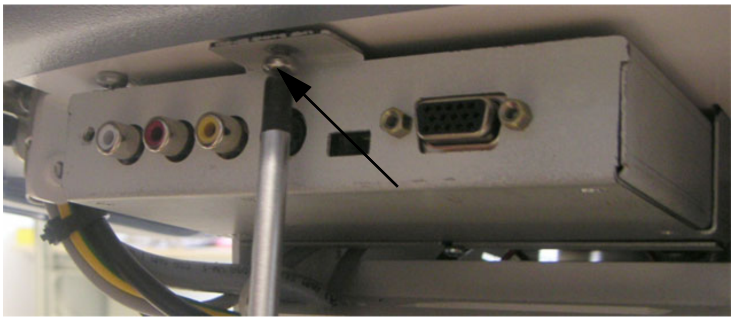


Figure 8-105 screw off 1 screw

2.) Disconnect the cables (VGA, Power, Chinch).

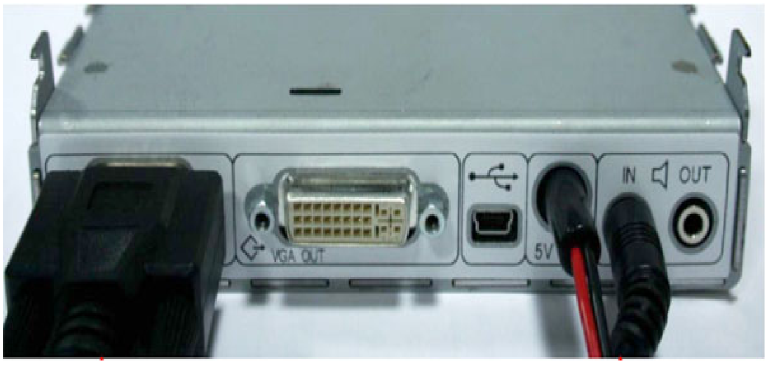


Figure 8-106 disconnect the cables

8-20-23-5 Image Resizer Box - Installation Procedure

1.) Connect the cables to the new Image Resizer Box and place it on its original position.
2.) Fasten it with the screw.
3.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
4.) Mount the complete lever at its original position.

8-20-24 Replacement of the LAN Connector

8-20-24-1 Manpower

One person, 10 minutes

8-20-24-2 Tools

Phillips screwdriver 1

8-20-24-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the complete lever.
3.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.

8-20-24-4 LAN Connector - Removal Procedure

1.) Screw off 1 screw, disconnect the cable and carefully remove it.

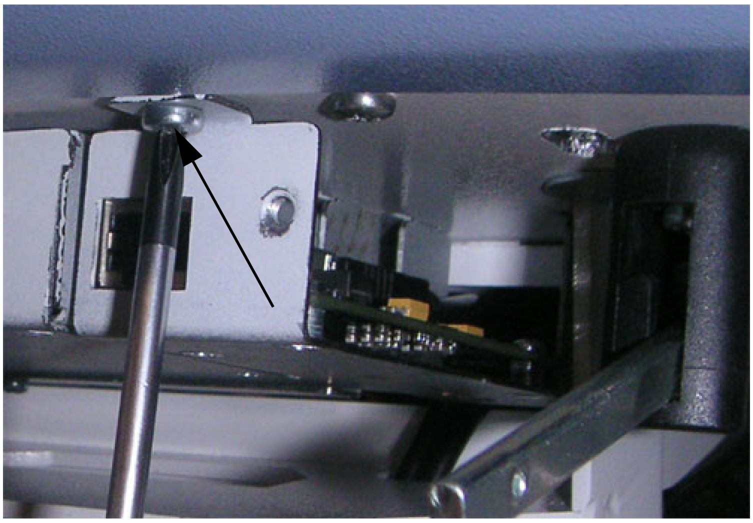


Figure 8-107 screw off the screw

8-20-24-5 LAN Connector - Installation Procedure

1.) Connect the new LAN Connector and place it on its original position.
2.) Fasten with the screw.
3.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.
4.) Mount the complete lever at its original position.

8-20-25 Replacement of the VGA Connector

8-20-25-1 Manpower

One person, 10 minutes

8-20-25-2 Tools

Phillips screwdriver 1

8-20-25-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.

2.) Remove the complete lever.

3.) Remove the Top Shelf Bottom Rear Cover as described in Section 8-20-13 on page 8-73.

8-20-25-4 VGA Connector - Removal Procedure

1.) Screw off 1 screw.

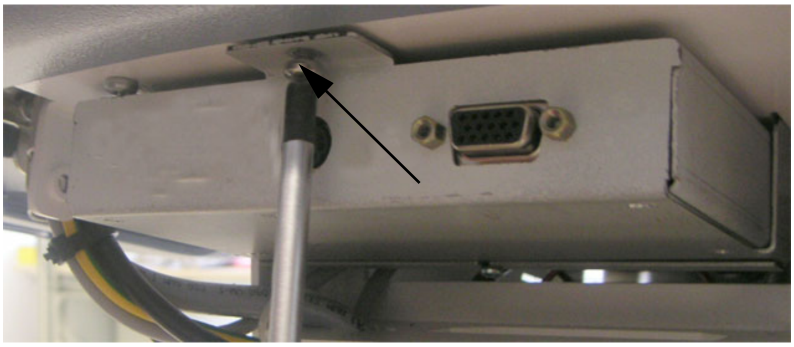


Figure 8-108 screw off the screw

2.) Disconnect the VGA cable.

8-20-25-5 VGA Connector - Installation Procedure

1.) Connect the VGA cable to the new VGA Connector and place it on its original position.

2.) Fasten it with the screw.

3.) Mount the Top Shelf Bottom Rear Cover as described in Section 8-20-13-5 on page 8-73.

4.) Mount the complete lever at its original position.

8-20-26 Replacement of the DVD Drive

8-20-26-1 Manpower

One person, 10 minutes

8-20-26-2 Tools

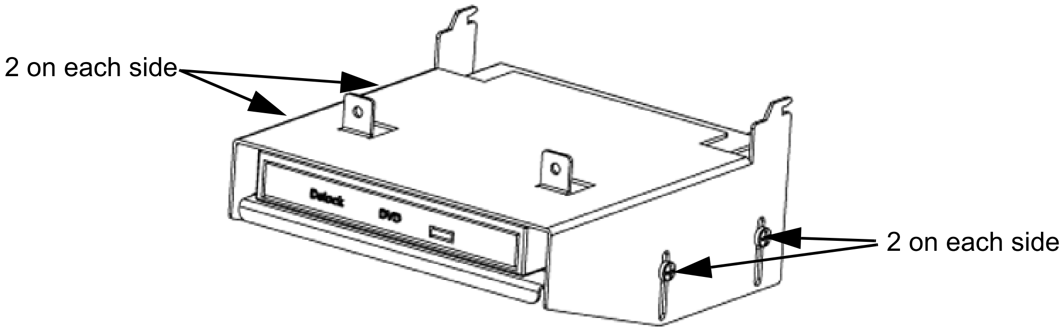
Phillips screwdriver 1

8-20-26-3 Preparations

1.) Power Off/Shutdown the system as described in Section 3-6-3 on page 3-72.
2.) Remove the Top Shelf Additional Bottom Cover as described in Section 8-20-12 on page 8-72 or remove the optional Probe Mux Bos as described in Section 8-20-9 on page 8-68.
3.) Remove the Top Shelf Bottom Front Cover as described in Section 8-20-19 on page 8-80.

8-20-26-4 DVD Drive - Removal Procedure

1.) Unplug the USB-cable and the Power-cable.
2.) Loosen the 4 screws (2 on each side) and remove the DVD drive.



2 on each side

2 on each side

Figure 8-109 unscrew the screws

8-20-26-5 DVD Drive - Installation Procedure

1.) Place the new DVD Drive and fasten it with the 4 screws (2 on each side).
2.) Reconnect the cables.
3.) Mount the Top Shelf Bottom Front Cover as described in Section 8-20-19-5 on page 8-80.
4.) Mount the Top Shelf Additional Bottom Cover as described in Section 8-20-12-5 on page 8-72 or mount the optional Probe Mux Box as described in Section 8-20-9-5 on page 8-69.

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Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of replacement parts available for the Voluson i / Voluson e.

NOTE: *Furthermore refer to **SN79040**, which is the best source for new FRU parts that are not yet implemented in this Service Manual.*

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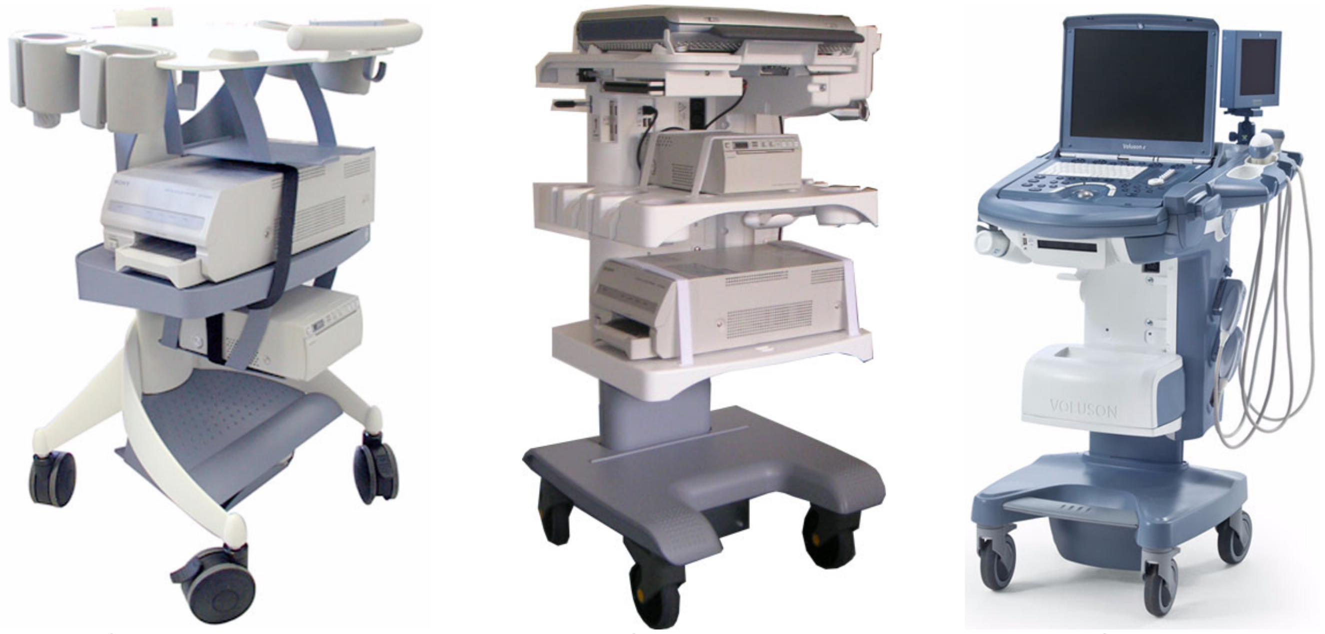
Section 9-2
List of Abbreviations

AC	Alternating Current
ADC	Analog to Digital Converter
ASIC	Application Specific Integrated Circuit
Assy	Assembly
BEP	Back End Processor
CPU	Central Processing Unit
CRU	Customer Replaceable Unit
CSD	Common Service Desktop
Ctrl	Control
DAC	Digital to Analog Converter
DC	Direct Current
DSP	Digital Signal Processing
EUM	Electronic User Manual
FEP	Front End Processor
FRU 1	Replacement part available in parts hub
FRU 2	Replacement part available from the manufacturer (lead time involved)
GPA	Battery Pack Assy
GPB	Bottom Basic Assy
GPC	BackEnd (PC) Assy
GPD	Display Module Assy
GPF	Fans Board Assy
GPH	Hard Disk Module
GPM	Probe and MUX Assy
GPP	DC/DC Power Supply Assy
GPS	Speaker Module
GPU	Keyboard Module Assy
HDD	Hard Disk Drive
HVPS	High Voltage Power Supply
Int	Internal
I/O	Input/Output
LCD	Liquid Crystal Display
LVPS	Low Voltage Power Supply
PCI	Peripheral Component Interconnect
PWA	Printed Wire Assembly
RBF	TR32 “Beamformer” Board
RBI	Radio Frequency “Controller” board
RPM	Probe & MUX (multiplexer) board
RPS	Power Supply board
SMBus	System Management Bus
SSW	Service Software (Service Platform)
UIS	Ultrasound Application Software

Section 9-3
Parts List Groups



Modo Cart **Dock Cart** **Voluson Station**

Figure 9-1 Cart's View

Table 9-2 Mechanical and user accessible parts

Item	Part Group Name	Table Number	Description
100- 131-	Mechanical Hardware Parts and Covers Keyboard parts	Table 9-3 on page 9-5 Table 9-4 on page 9-8	Mechanical Hardware Parts (such as Fan and Speaker Module) Console housing and Key Caps Language Kits Keyboard Parts (TGC-Board, Trackball, Main-Board,..)
200- 210-	Electronic Parts • Electronic Parts cont´d	Table 9-5 on page 9-10 Table 9-6 on page 9-13	BackEnd Processor, FrontEnd and Power Supply Harddisk, Battery, Keyboard, Display (LCD) Module parts
300-	Options and Upgrades	Table 9-7 on page 9-15	
400-	Miscellaneous Cables	Table 9-8 on page 9-20	
500 510- 520- 530- 540- 550- 560- 600-	Optional Peripherals and Accessories • Recording Tools • Printers • Drives & additional Devices • Drives & additional Devices cont´d • Optional Equipment • Optional Modo Cart • Optional Dock Cart • Optional Voluson Station	Table 9-10 on page 9-26 Table 9-11 on page 9-28 Table 9-12 on page 9-29 Table 9-13 on page 9-30 Table 9-14 on page 9-32 Table 9-15 on page 9-33 Table 9-16 on page 9-34 Table 9-20 on page 9-38	Video Recorder, DVD Recorder, Video Converter B/W Printer, Color Printer, DeskJet Printer DVD-Drive, USB Flash Memory Device, etc. Footswitch, GoPack, RIC Holder Modo Cart Dock Cart Voluson Station
	System Manuals - Voluson i System Manuals - Voluson e	Table 9-26 on page 9-44 Table 9-27 on page 9-46	
700- 710-	Probes • 2D Transducers • Real-Time 4D Volume Probes	Table 9-29 on page 9-51 Table 9-30 on page 9-52	
800-	Biopsy Needle Guides	Table 9-31 on page 9-54	

Section 9-4
Mechanical Hardware Parts and Covers

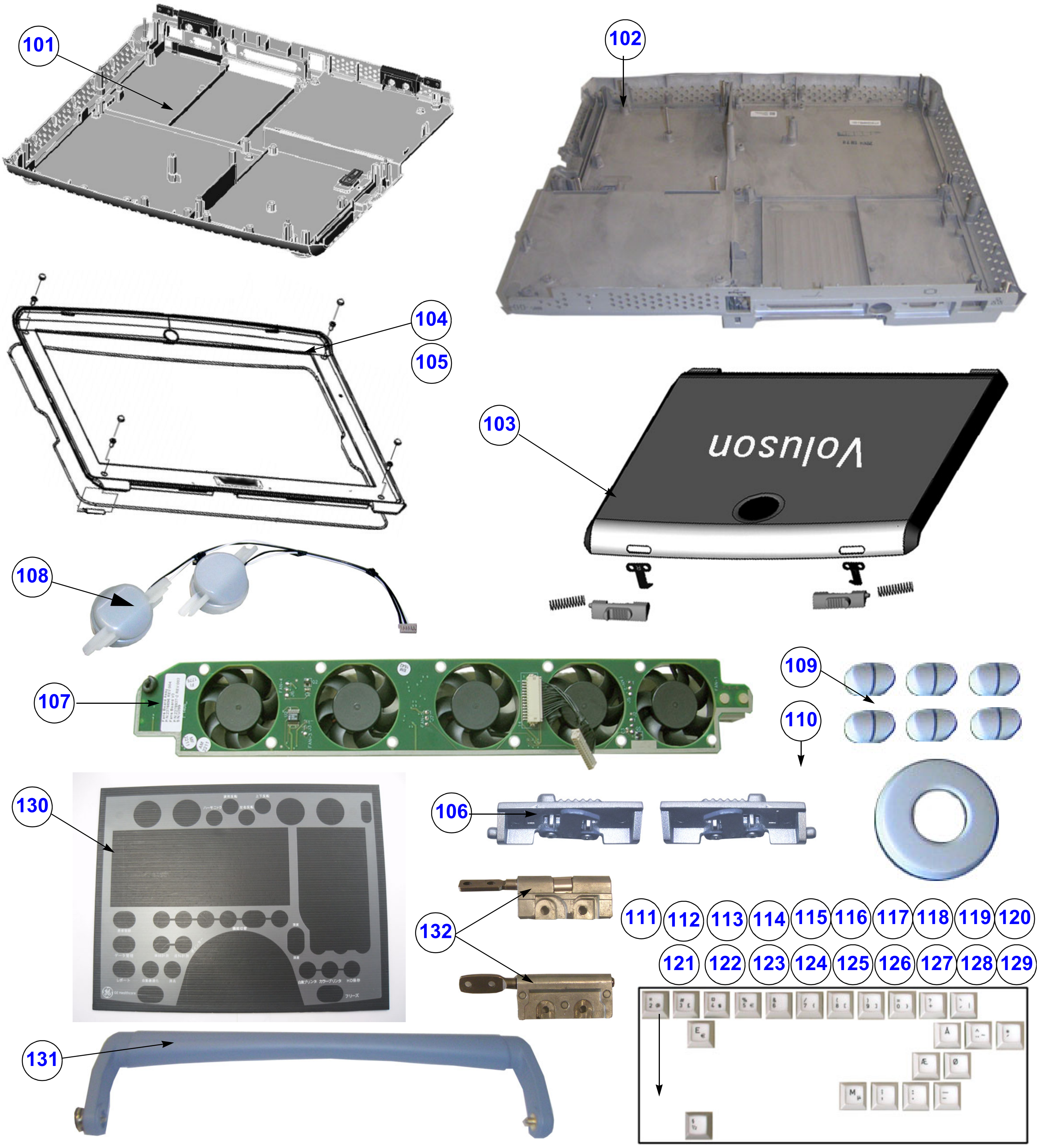

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Figure 9-2 mechanical Hardware Parts and Covers

NOTE: The illustrations may not correspond to the actual product!

Table 9-3 mechanical Hardware Parts and Covers

Item	Part Name	Part Number	Description	Qty	CRU	FRU
101	GPB1-1a - Bottom Basic Assy	KTZ154743	Bottom Cover (Bottom Housing)	1	N	1
102	GPB10 Bottom Basic Assy	KTZ302046	Bottom Cover without hinges (Bottom Housing - no PMCIA Slot)	1	N	1
103	Display Rear Cover Assy	KTZ154757	Display Rear Cover (Top Housing) incl. Latches	1	N	1
104	Display Front Frame Assy	KTZ154758	Display Front Frame (with Logo and naming attached) (**only** used at Voluson **i** systems)	1	N	1
105	Display Front Frame Assy Voluson i / Voluson e	KTZ154783	Display Front Frame + 2 naming stickers (1 Voluson i , 1 Voluson e); (can replace KTZ154758)	1	N	1
106	Latch Assy (right + left)	KTZ196202	Display “Locking” Latches (right + left)	1	N	1
107	GPF1 - Fans Board Assy	KTZ154741	Board with 5 fans	1	N	1
108	GPS1 - Speakers Module	KTZ154742	Left and Right Speaker	1	N	1
109	Caps for TGC Slide-pot. (6 pcs.) and Rotary Knob (1 pcs.)	KTZ196175	Set includes **6** Caps for TGC Slide-pot. **+ 1** Rotary Knob	6+1	Y	1
110	Screw Kit	KTZ196176	various screws	1	Y	1
111	Key Cap Kit - Swedish	KTZ154749 H48651LZ	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
112	Key Cap Kit - Danish	KTZ154750 H48651M	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
113	Key Cap Kit - Norwegian	KTZ154751 H48651MA	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
114	Key Cap Kit - Finnish	KTZ154752 H48651MB	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
115	Key Cap Kit - Spanish	KTZ154753 H48651MC	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
116	Key Cap Kit - French	KTZ154754 H48651MD	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
117	Key Cap Kit - German	KTZ154755 H48651ME	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
118	Key Cap Kit - Italian	KTZ154756 H48651MF	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
119	Key Cap Kit - Portoguese	KTZ154781 H45021RB	kit (printed) incl. special native language keys + tool for pulling out	1	Y	1
120	Key Cap Kit 2 - Swedish	KTZ154793 H48661CC	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
121	Key Cap Kit 2 - Danish	KTZ154794 H48661CD	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
122	Key Cap Kit 2 - Norwegian	KTZ154795 H48661CE	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
123	Key Cap Kit 2 - Finnish	KTZ154796 H48661CF	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1

Table 9-3 mechanical Hardware Parts and Covers

Item	Part Name	Part Number	Description	Qty	CRU	FRU
124	Key Cap Kit 2 - Spanish	KTZ154797 H48661CG	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
125	Key Cap Kit 2 - French	KTZ154798 H48661CH	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
126	Key Cap Kit 2 - German	KTZ154799 H48661CJ	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
127	Key Cap Kit 2 - Portuguese	KTZ154802 H48661CK	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
128	Key Cap Kit 2 - Japanese	KTZ280114 H48661CL	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
129	Key Cap Kit 2 - Italian	KTZ154801 H48661CM	kit (Rafi lasered, Whanam) incl. special native language keys + tool for pulling out	1	Y	1
130	Japanese Keyboard Film	KTZ280116 H48671WF	Japanese Keyboard Film	1	Y	1
131	Handle	KTZ280016 ⇨ **BT Version:**	Handle applicable at Voluson i / Voluson e	1	Y	1
132	Hinges for Display Voluson i / Voluson e	KTZ280195	Hinges Voluson i / Voluson e for old and new display	4	Y	1

Section 9-5
Keyboard parts

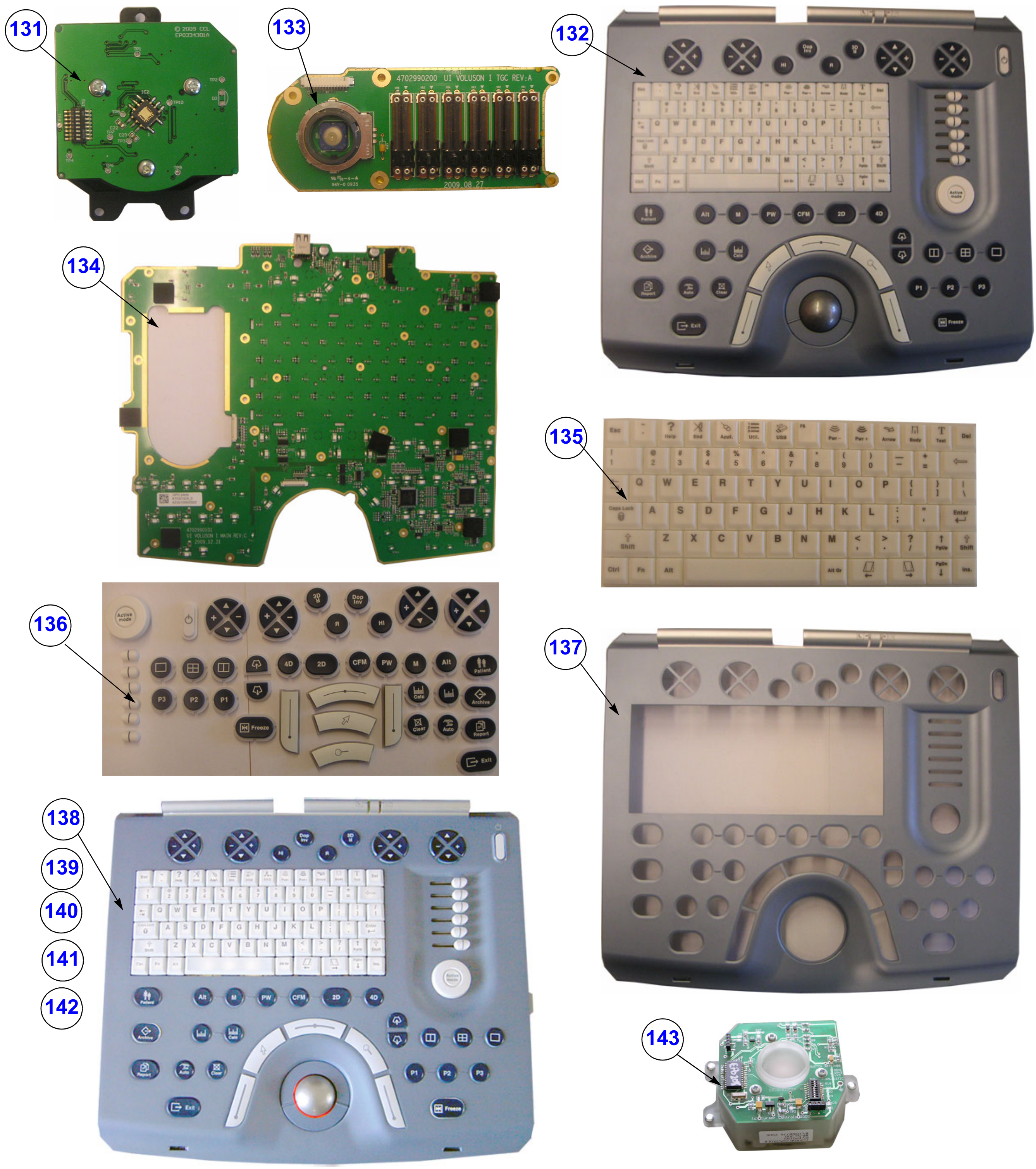
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Figure 9-3 Keyboard parts

NOTE: *The illustrations may not correspond to the actual product!*

Table 9-4 Keyboard Parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
131	Trackball GPU80 (W)	KTZ280191	Trackball GPU80 (incl. trackball ring) (Whanam)	1	N	1
132	GPU80 Keyboard Module (W) Voluson i / Voluson e	KTZ301928	GPU80 Keyboard Module (Whanam) Voluson i / Voluson e	1	N	1
133	TGC Board GPU80 (W)	KTZ301972	TGC Board GPU80 (Whanam)	1	N	1
134	Main Board GPU80 (W)	KTZ301973	Main Board GPU80 (Whanam)	1	N	1
135	Alphanumeric Set GPU80 (W)	KTZ301974	Alphanumeric Set GPU80 (Whanam)	1	N	1
136	Functionkey Set GPU80 (W)	KTZ301975	Functionkey Set GPU80 (Whanam)	1	N	1
137	Upper Cover GPU80 (W)	KTZ301981	Upper Cover GPU80 (Whanam)	1	N	1
138	GPU1-2c - Keyboard Module Assy (R)	KTZ209075	Control Panel for the Voluson i / Voluson e incl. trackball, special knobs and switches + alphanumeric keyboard in English (check if special key cap kit is needed; (Rafi) see: Table 9-3 on page 9-5)	1	N	1
139	GPU3 - Keyboard Module Assy (H) Voluson i (R)	KTZ220905 ⇨ **BT Version:**	Control Panel for the Voluson i incl. trackball, special knobs and switches (white LED's) + alphanumeric keyboard in English (check if special key cap kit is needed; (Rafi) see: Table 9-3 on page 9-5 (can replace KTZ209075)	1	N	1
140	GPU4 - Keyboard Module Assy (H) Voluson i (R)	KTZ280170	Control Panel for the Voluson i incl. trackball, special knobs and switches (white LED's)+ alphanumeric keyboard in English (check if special key cap kit is needed; (Rafi) see: Table 9-3 on page 9-5 (can replace KTZ220905)	1	N	1
141	GPU50 - Keyboard Module Assy Voluson e (R)	KTZ220896 ⇨ **BT Version:**	Control Panel for the Voluson e incl. trackball, special knobs and switches (yellow LED's)+ alphanumeric keyboard in English (check if special key cap kit is needed;; (Rafi) see: Table 9-3 on page 9-5)	1	N	1
142	GPU51 - Keyboard Module Assy (H) Voluson e (R)	KTZ280067 ⇨ **BT Version:**	Control Panel for the Voluson e incl. trackball, special knobs and switches (yellow LED's)+ alphanumeric keyboard in English (check if special key cap kit is needed; (Rafi) see: Table 9-3 on page 9-5) (can replace KTZ220896)	1	N	1
143	Trackball Kit (incl. trackball ring) for Voluson i / Voluson e (R)	KTZ196174	generates X-Y-Coordinates of Trackball-Movements like moving a PC-Mouse (Rafi) **NOTE:** In case of Trackball defect at Voluson i systems with serial number ≤ **B00060**, the complete Keyboard Module **GPU2 (KTZ209075) has to be replaced!**	1	N	1

NOTE: *New GPU80 parts are used in Forward Production with S/N B03001 upwards at* Voluson i *and S/N B54001 upwards at* Voluson e.

NOTE: *For GPU80 parts SW7.1.4 and SW8.2.0 or higher is required.*

Section 9-6
Electronic Parts

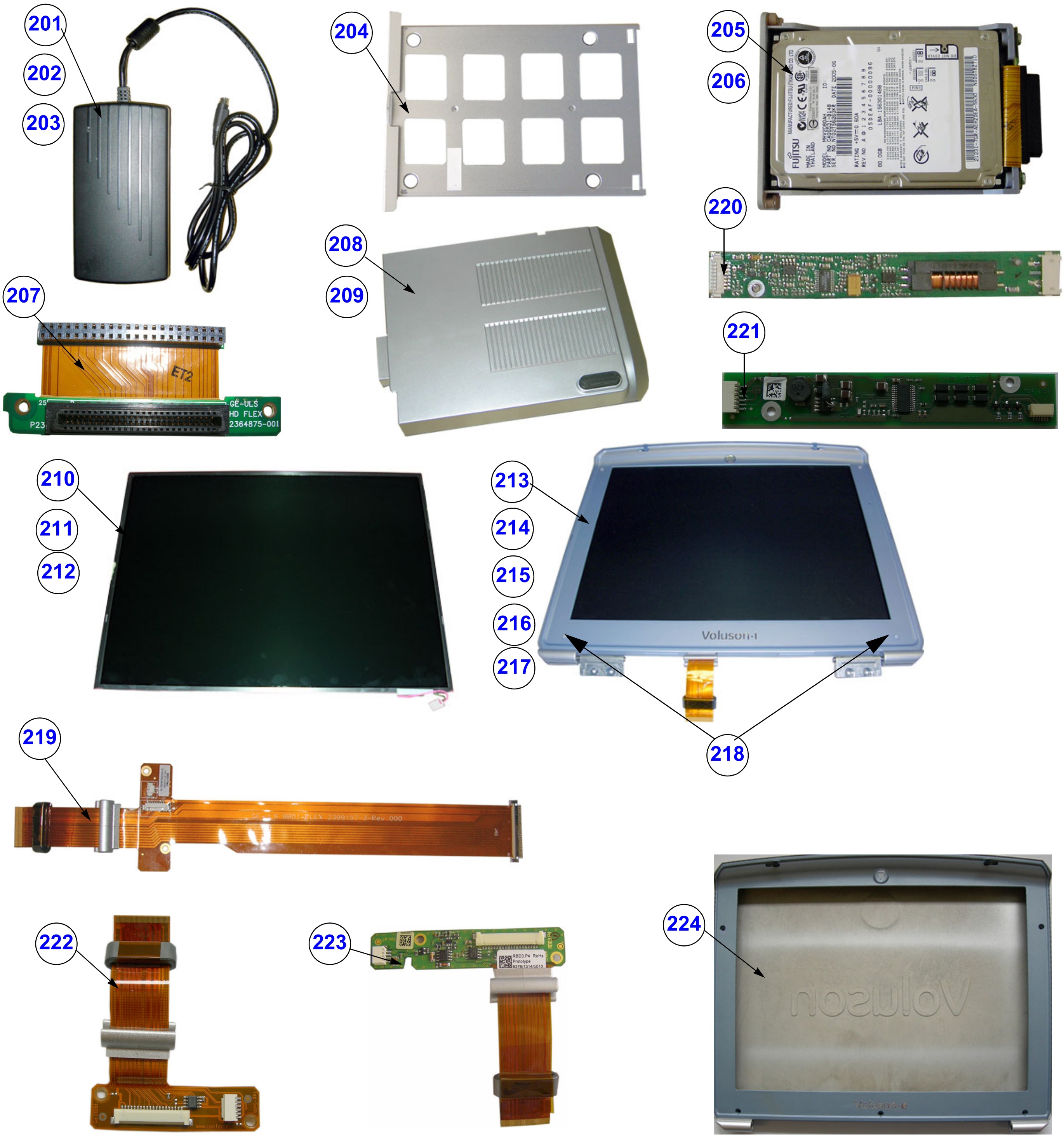
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Figure 9-4 Electronic Parts

NOTE: The illustrations may not correspond to the actual product!

Table 9-5 Electronic Parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
201	AC/DC Adapter	KTZ209076	AC Adapter (90 to 264V) for all countries; (for proper power cord see: Table 9-8)	1	Y	1
202	AC/DC Adapter inverse polarity protection	KTZ220798	AC Adapter (90 to 264V) inverse polarity protection for all countries; (for proper power cord see: Table 9-8) (can replace KTZ209076)	1	Y	1
203	AC/DC Adapter inverse polarity protection (labeling)	KTZ280156	AC/DC Adapter inverse polarity protection (labeling) (can replace KTZ209076 and KTZ220798)	1	Y	1
204	Hard Disk Tray	KTZ220326	Hard Disk Tray	1	N	1
205	GPH1 - Hard Disk Module	KTZ154745	Hard Disk (80GB) Assy	1	N	1
206	GPH5 - Hard Disk Module	KTZ302137	GPH5 - Hard Disk Module (SATA)	1	N	1
207	HD Module Flex cable	KTZ220328	Hard Disk Module Flex cable	1	N	1
208	GPA1 - Battery Pack Assy	KTZ220278	Internal Battery Pack 16.8V	1	Y	1
209	GPA5 - Battery Pack Assy	KTZ302054	Internal Battery Pack (can replace KTZ220278)	1	Y	1
210	LCD Display	KTZ196132	LCD Display (with anti glare foil) (only use for GPD1)	1	N	1
211	LCD15” AUO G150XG01	KTZ301522	LCD Display (with anti glare foil) (only use for GPD5 and GPD6)	1	N	1
212	LCD15” AUO G150XTN05.0	KTZ303362	LCD15” AUO G150XTN05.0 (can only be used in combination with GPD7)	1	N	1
213	GPD1 - Display Module	KTZ154744	15” LCD Panel Kit incl. BBDI Flex cable, Display Rear Cover incl. Latches, Front Frame (with Logo and naming attached) and Hinges (**only** used at Voluson **i** systems)	1	N	1
214	GPD1-1a - Display Module	KTZ154782	15” LCD Panel Kit incl. BBDI Flex cable, Display Rear Cover incl. Latches, Front Frame (with Logo attached), Hinges + 2 naming stickers (1 Voluson i, 1 Voluson e) (can replace KTZ154744)	1	N	1
215	GPD5 - Display Module	KTZ301515	15” LCD Panel Kit incl. BBDI Flex cable, Display Rear Cover incl. Latches, Front Frame (with Logo attached), Hinges + 2 naming stickers (1 Voluson i, 1 Voluson e) (SW 7.1.3 or SW 8.1.4 is necessary)	1	N	1
216	GPD6 - Display Module	KTZ302150	15” LCD Panel Kit incl. BBDI Flex cable, Display Rear Cover incl. Latches, Front Frame (with Logo attached), Hinges + 2 naming stickers (1 Voluson i, 1 Voluson e (SW 7.1.3 or SW 8.1.4 is necessary)	1	N	1
217	GPD7 - Display Module	KTZ303389	15” LCD Panel Kit incl. BBDI Flex cable, Display Rear Cover incl. Latches, Front Frame (with Logo attached), Hinges + 2 naming stickers (1 Voluson i, 1 Voluson e) with SW8.2.2 and SW CC200 (BT’14) and higher	1	N	1
218	Display Screw Caps	KTZ220318	Caps to cover screws on Display Front Frame (4 pcs.)	4	Y	1
219	BBDI Rigid Flex Assy	KTZ220308	BBDI Rigid Flex Assy (incl. Flex Cover and Ferrite) (only used for GPD1-1a)	1	N	1
220	LCD Backlight Inverter board	KTZ220302	LCD Backlight Inverter bd (only used for GPD1-1a)	1	N	1

Table 9-5 Electronic Parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
221	Board RBT1.P1 LCD Backlight inverter	KTZ301526	Board RBT1.P1 LCD Backlight inverter (only used for GPD5 and GPD6)	1	N	1
222	Board RBD2.P3 Flex board	KTZ301524	Board RBD2.P3 Flex board (use for GPD5 and GPD6)	1	N	1
223	Board RBD3.P4 Flex Board	KTZ303388	Board RBD3.P4 Flex Board (can only be used in combination with GPD7)	1	N	1
224	Display Housing complete	KTZ280157	Display Front frame with Logo + 2 naming stickers (Voluson i, Voluson e) and Display rear cover	1	N	1

Section 9-6 Electronic Parts (cont'd)

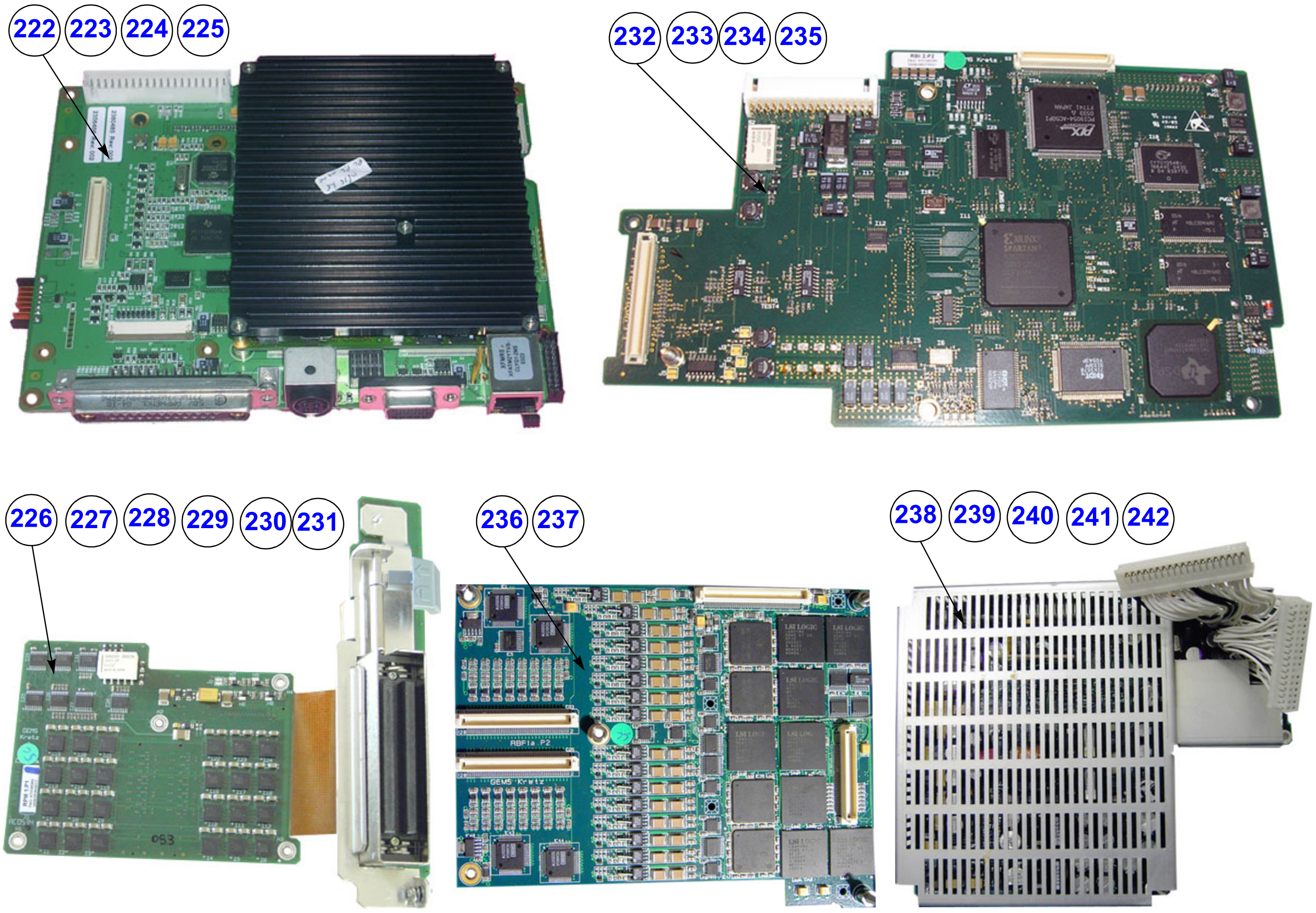
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Figure 9-5 Electronic Parts

NOTE: The illustrations may not correspond to the actual product!

Table 9-6 Electronic Parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
222	GPC1-1a - BackEnd (PC) Assy	KTZ220334	ETX Base Board incl. Central Processing Unit (CPU)	1	N	1
223	GPC2-2a - BackEnd (PC) Assy	KTZ220640	ETX Base Board incl. Central Processing Unit (CPU) (can replace GPC1, **SW 6.0.2** or higher is required and **has to be installed immediately after replacemen**t)	1	N	1
224	GPC3 - BackEnd (PC) Assy	KTZ280085	ETX Base Board incl. Central Processing Unit (CPU) (PMC Version 23); (can replace GPC2); **SW 6.0.2** or higher is required and **has to be installed immediately after replacemen**t	1	N	1
225	GPC10 - Back End (PC) Assy	KTZ302039	ETX Base Board incl. Central Processing Unit (CPU) will be used at Voluson i SNo B03501 and higher and Voluson e B54177 - B54195, B54216, B54501 and higher SW 7.1.4 and SW 8.2.0 Rev.B or higher is required and **has to be installed after replacemen**t	1	N	1
226	GPM1 - Probe and MUX Assy	KTZ196093	Probe & MUX (multiplexer) board + Probe connector Assy	1	N	1
227	GPM2 - Probe and MUX Assy	KTZ300142	Probe & MUX (multiplexer) board + Probe connector Assy (can replace GPM1)	1	N	1
228	GPM3 - Probe and MUX Assy	KTZ300329	Probe & MUX (multiplexer) board + Probe connector Assy (can replace GPM2)	1	N	1
229	GPM4 - Probe and MUX Assy	KTZ301298	Probe & MUX (multiplexer) board + Probe connector Assy (can replace GPM3)	1	N	1
230	GPM5 - Probe and MUX Assy	KTZ301759	Probe & MUX (multiplexer) board + Probe connector Assy (can replace GPM4)	1	N	1
231	GPM50 - Probe and MUX Assy	KTZ301008	Probe & MUX (multiplexer) board + Probe connector Assy (can only be used on Voluson i/e BT'07 or higher)	1	N	1
232	RBI1-1b.P1 - RF-Board	KTZ196055	Radio Frequency “Controller” board	1	N	1
233	RBI2-2e.P2 - RF-Board	KTZ196095	Radio Frequency “Controller” board (can replace RBI1)	1	N	1
234	RBI3a.P3 - RF-Board	KTZ196212	Radio Frequency “Controller” board (can replace RBI1 and RBI2)	1	N	1
235	RBI4.P4 - RF-Board	KTZ303113	Radio Frequency “Controller” board incl. Coax-cable (can replace RBI1, RBI2 and RBI3)	1	N	1
236	RBF1-1b - “Beamformer” Board	KTZ196094	Transmitter/Receiver, “Beamformer” Board (1 pcs.)	2	N	1
237	RBF2.P3 - “Beamformer” Board	KTZ196182	Transmitter/Receiver, “Beamformer” Board (1 pcs.) (can replace RBF1)	2	N	1
238	GPP2c - DC/DC Power Supply Assy	KTZ196092	Power Supply Module	1	N	1
239	GPP3 - DC/DC Power Supply Assy	KTZ196134	Power Supply Module (can replace GPP2)	1	N	1
240	GPP4 - DC/DC Power Supply Assy	KTZ300141	Power Supply Module (can replace GPP2 and GPP3)	1	N	1
241	GPP5 - DC/DC Power Supply Assy	KTZ300947	Power Supply Module (can replace GPP2, GPP3 and GPP4)	1	N	1

Table 9-6 Electronic Parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
242	GPP6 DC/DC Power Supply	KTZ302683	GPP6 DC/DC Power Supply (can replace GPP2, GPP3, GPP4 and GPP5)	N	N	1

Section 9-7
Options and Upgrades

Table 9-7 Options and Upgrades

Item	Part Name	Part Number	Description	Qty	CRU	FRU
301	System/Boot DVD (6.0.2) for Voluson i / Voluson e **BT'06**	KTZ196268	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
302	System/Boot DVD (6.1.0) for Voluson i / Voluson e **BT'06**	KTZ196314	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
303	System/Boot DVD (7.0.1) for Voluson i / Voluson e **BT'07**	KTZ196342	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
304	System/Boot DVD (7.1.0) for Voluson i / Voluson e **BT'07**	KTZ280018	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc. SW 7.1.0 is necessary when using the Dock Cart	1	Y	1
305	System/Boot DVD (7.1.1) for Voluson i / Voluson e **BT'07**	KTZ280104	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
306	System/Boot DVD (7.1.2) for Voluson i / Voluson e **BT'07**	KTZ280107	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
307	System/Boot DVD (7.1.3) for Voluson i / Voluson e **BT'07**	KTZ280176	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
308	System/Boot DVD (7.1.4) for Voluson i / Voluson e **BT'07**	KTZ280216	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
309	System/Boot DVD (8.0.1) for Voluson i / Voluson e **BT'09**	KTZ280087	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
310	System/Boot DVD (8.1.0) for Voluson i / Voluson e **BT'09**	KTZ280112	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
311	System/Boot DVD (8.1.1) for Voluson i / Voluson e **BT'09**	KTZ280124	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
312	System/Boot DVD (8.1.2) for Voluson i / Voluson e **BT'09**	KTZ280130	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1

Table 9-7 Options and Upgrades

Item	Part Name	Part Number	Description	Qty	CRU	FRU
313	System/Boot DVD (8.1.3) for Voluson i / Voluson e **BT'09**	KTZ280151	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
314	System/Boot DVD (8.1.4) for Voluson i / Voluson e **BT'09**	KTZ280153	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
315	System/Boot DVD (8.1.5) for Voluson i / Voluson e **BT'09**	KTZ280165	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
316	System/Boot DVD (8.1.6) for Voluson i / Voluson e **BT'09**	KTZ280177	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
317	System/Boot DVD (8.2.0 Rev.B) for Voluson i / Voluson e **BT'09**	KTZ280192	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
318	System/Boot DVD (8.2.1 Rev.C) for Voluson i / Voluson e **BT'09**	KTZ280208	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
319	System/Boot DVD (8.2.2) for Voluson i / Voluson e **BT'09**	KTZ280275	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
320	System/Boot DVD CC200 Ext.0 (14.0.0) for Voluson i / Voluson e BT'14	KTZ280269	bootable DVD for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
321	USB System Stick 8.0.1 Voluson i / Voluson e BT´09	KTZ280119	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
322	USB System Stick 8.1.0 Voluson i / Voluson e BT´09	KTZ300435	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
323	USB System Stick 8.1.1 Voluson i / Voluson e BT´09	KTZ280125	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
324	USB System Stick 8.1.2 Voluson i / Voluson e BT´09	KTZ280131	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
325	USB System Stick 8.1.3 Voluson i / Voluson e BT´09	KTZ280152	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1

Table 9-7 Options and Upgrades

Item	Part Name	Part Number	Description	Qty	CRU	FRU
326	USB System Stick 8.1.4 Voluson i / Voluson e BT´09	KTZ280154	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
327	USB System Stick 8.1.5 Voluson i / Voluson e BT´09	KTZ280166	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
328	USB System Stick 8.1.6 Voluson i / Voluson e BT´09	KTZ280178	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
329	USB System Stick 8.2.0 Voluson i / Voluson e BT´09	KTZ280193	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
330	USB System Stick 8.2.1 Voluson i / Voluson e BT´09	KTZ280209	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
331	USB System Stick 8.2.2 Voluson i / Voluson e BT´09	KTZ280276	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
332	USB System Stick CC200 Ext.0 (14.0.0) Voluson i / Voluson e BT’14	KTZ280270	bootable USB System Stick for System HDD recovery Contents: SP with newest MS patches, Linux rescue partition, System C: Image, UISApp, Backup, EUM, Database Repair Tool, etc.	1	Y	1
333	BIOS Upgrade DVD for Voluson i / Voluson e	KTZ196370	BIOS Upgrade DVD for Voluson i / Voluson e (ver. 890)	-	Y	N
334	Voluson i BT06 toBT07 Upgrades	H48661CY	Voluson i BT06 toBT07 Upgrades Upgrade kit contains: System DVD, BT’07 User and Service Manual and Upgrade Manual	-	N	N
335	Voluson e BT06 to BT07 Upgrades	H48661CZ	Voluson e BT06 to BT07 Upgrades Upgrade kit contains: System DVD, BT’07 User and Service Manual and Upgrade Manual	-	N	N
336	Voluson i BT07 toBT09 Upgrades	H48671HC	Voluson i BT07 toBT09 Upgrades Upgrade kit contains: System DVD, BT’09 User and Service Manual and Upgrade Manual	-	N	N
337	Voluson e BT07 to BT09 Upgrades	H48671GD	Voluson e BT07 to BT09 Upgrades Upgrade kit contains: System DVD, BT’09 User and Service Manual and Upgrade Manual	-	N	N
338	Voluson i BT06 toBT09 Upgrades	H48671MF	Voluson i BT06 toBT09 Upgrades Upgrade kit contains: System DVD, BT’09 User and Service Manual and Upgrade Manual	-	N	N
339	Voluson eBT06 toBT09 Upgrades	H48671MB	Voluson eBT06 toBT09 Upgrades Upgrade kit contains: System DVD, BT’09 User and Service Manual and Upgrade Manual	-	N	N
340	Voluson i BT06/BT07/BT09 to 8.2.x upgrade S	H48681JR	Voluson i BT06/BT07/BT09 to 8.2.x upgrade S	-	N	N

Table 9-7 Options and Upgrades

Item	Part Name	Part Number	Description	Qty	CRU	FRU
341	Voluson i BT06/BT07/BT09 to 8.2.x upgrade L	H48681JS	Voluson i BT06/BT07/BT09 to 8.2.x upgrade L	-	N	N
342	Voluson e BT06/BT07/BT09 to 8.2.x upgrade S	H48681JH	Voluson e BT06/BT07/BT09 to 8.2.x upgrade S	-	N	N
343	Voluson e BT06/BT07/BT09 to 8.2.x upgrade L	H48681JJ	Voluson e BT06/BT07/BT09 to 8.2.x upgrade L	-	N	N
344	Volume Package (3D Mode, Real Time 4D,VOCAL and TUI)	H48651MG	encrypted Software Option string (password) which is specific for each **Voluson i** system	-	N	N
345	Interface for DICOM 3 Standard	H48651MJ	encrypted Software Option string (password) which is specific for each **Voluson i** system	-	N	N
346	Interface for DICOM 3 Standard	H48651WG	encrypted Software Option string (password) which is specific for each **Voluson e** system	-	N	N
347	4D Basic (4D rendering only, no 3D Mode and no access to volume data)	H48661DA	encrypted Software Option string (password) which is specific for each **Voluson e** system	-	N	N
348	3D/4D Advanced (3D Mode and Real Time 4D)	H48661DB	encrypted Software Option string (password) which is specific for each **Voluson e** system **Note:** The option “3D/4D Advanced” is only available if the option “4D Basic” is also enabled.	-	N	N
349	RIC Probe	H48661DC	encrypted Software Option string (password) which is specific for each **Voluson e** system **Note:** The Real time 4D endocavity probe (RIC) is only applicable if this option is enabled.	-	N	N
350	4D View PC Software	H48651FB	stand alone PC-Software which can be used to view and work on data produced with Voluson i / Voluson e	-	N	N
351	VCI	H48661CP	encrypted Software Option string (password) which is specific for each **Voluson i** system **Note:** The option “VCI” is only available if the option “Volume Ultrasound” is also enabled.	-	N	N
352	RT 4D Biopsy	H48661CS	encrypted Software Option string (password) which is specific for each **Voluson i** system **Note:** The option “4D Biopsy” is only available if the option “Volume Ultrasound” is also enabled.	-	N	N
353	XTD-View	H48661CR	encrypted Software Option string (password) which is specific for each Voluson i/e system	-	N	N
354	SonoAVC	H48671JZ	encrypted Software Option string (password) which is specific for each Voluson i / Voluson e system	-	N	N
355	SonoVCAD Heart	H48671KA	encrypted Software Option string (password) which is specific for each Voluson i system	-	N	N
356	SonoVCAD labor	H48671JY	encrypted Software Option string (password) which is specific for each Voluson i / Voluson e system	-	N	N
357	STIC	H48671KB	encrypted Software Option string (password) which is specific for each Voluson i system	-	N	N
358	SonoNT	H48681JK	encrypted Software Option string (password) which is specific for each Voluson i system	-	N	N

➡ **BT Version:** The options “RT 4D Biopsy” and “VCI” are applicable at Voluson i systems with BT´07 SW and higher.

➡ **BT Version:** The option “XTD-View” is only applicable at Voluson i / Voluson e with BT´07 software and higher.

➡ **BT Version:** The options “SonoVCAD heart” and “STIC” are only applicable at Voluson i systems with BT´09 SW.

➡ **BT Version:** The options “SonoVCAD labor” and “SonoAVC” are only applicable at Voluson i/e with BT´09 SW.

➡ **BT Version:** The options “SonoNT” is only applicable at Voluson i / Voluson e with BT’11 SW.

⚠ **NOTICE** A sales order has to be obtained for item 333 - 358.

Section 9-8
Miscellaneous Cables

Table 9-8 Miscellaneous Cables

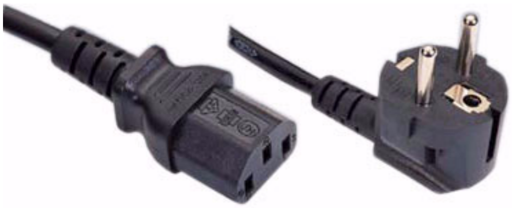
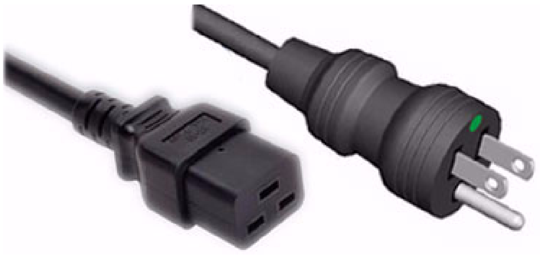
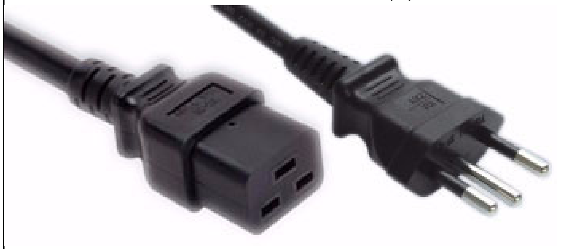
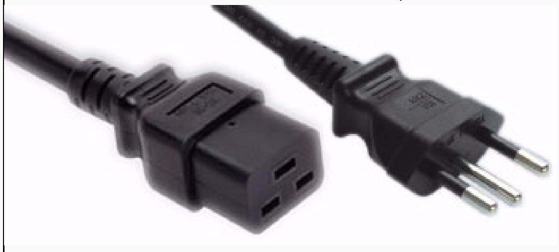
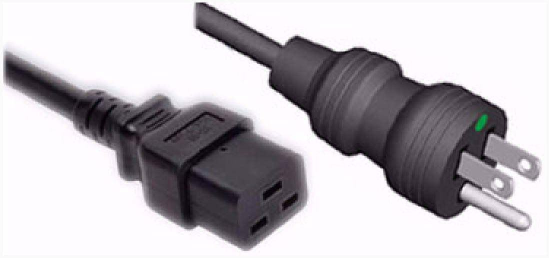
Item	Part Name	Part Number	Description	Qty	CRU	FRU
401	Power Cord - Europe 230V	KTZ220388	Power Cord Europe 230V/240V 	-	Y	1
402	Power Cord - USA Hosp.Grade	KTZ220389	Power Cord USA Hospital Grade 	-	Y	1
403	CA-NET Cable Brasilien 10A;2,5M	KTZ280185	Ca-Net Cable Brasilien 10A;2,5M 	1	Y	1
404	CA-NET Cable Brasilien 20A;3M	KTZ280186	Ca-Net Cable Brasilien 20A;3M 	1	Y	1
405	Power Cord - Japan (Hosp.grade)	KTZ220390	Power Cord Japan Hospital Grade 	-	Y	1

Table 9-8 Miscellaneous Cables

Item	Part Name	Part Number	Description	Qty	CRU	FRU
406	Power Cord - China	KTZ220391	Power Cord China	-	Y	1
407	Power Cord - Australia	KTZ220392	Power Cord Australia	-	Y	1
408	Power Cord - India	KTZ220387	Power Cord India	-	Y	1
409	Power Cord - United Kingdom	KTZ220476	Power Cord United Kingdom (UK) 240V	-	Y	1
410	Power Cord - South Africa	KTZ220477	Power Cord South Africa	-	Y	1

Table 9-8 Miscellaneous Cables

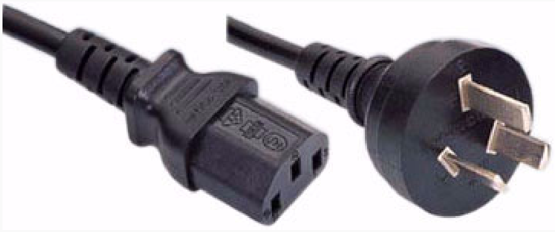
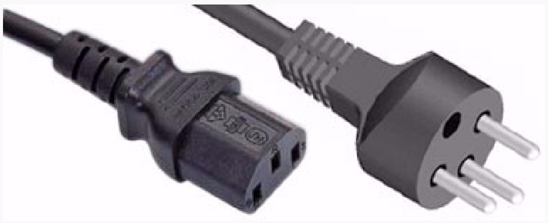
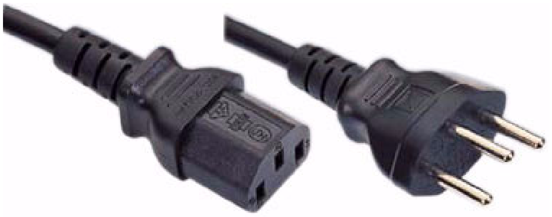
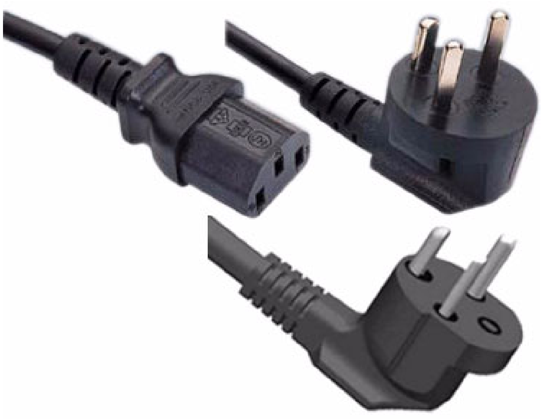
Item	Part Name	Part Number	Description	Qty	CRU	FRU
411	Power Cord - Argentina	KTZ220478	Power Cord Argentina 	-	Y	1
412	Power Cord - Israel	KTZ220479	Power Cord Israel 	-	Y	1
413	Power Cord - Switzerland	KTZ220480	Power Cord Switzerland 	-	Y	1
414	Power Cord - Denmark	KTZ220481	Power Cord Denmark 	-	Y	1

Table 9-8 Miscellaneous Cables

Item	Part Name	Part Number	Description	Qty	CRU	FRU
415	Power Extender Cable	KTZ220579	Power Extender Cable for (optional) Peripherals, 1m (**only** used in combination with Modo Cart - H48651TD) 	1	Y	1
416	Power Extender Cable	KTZ220585	Power Extender Cable for (optional) Peripherals , 30cm (**only** used in combination with Modo Cart - H48651TD) 	1	Y	1
417	Power Extender (Splitter) Cable	KTZ220569	Power Extender Cable for Peripherals, split 1 to 3 (**only** used in combination with Modo Cart - H48651) 	1	Y	1
418	Power Extender Cable 2 M	KTZ301990	Power Extender Cable, 2M 	1	Y	1

Table 9-8 Miscellaneous Cables

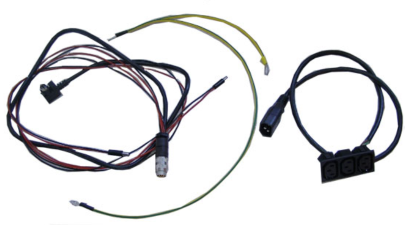
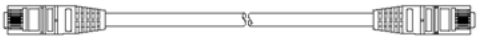
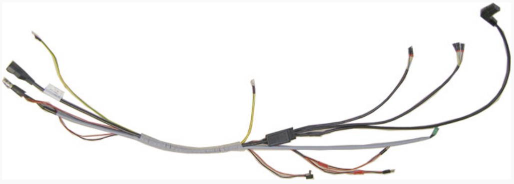
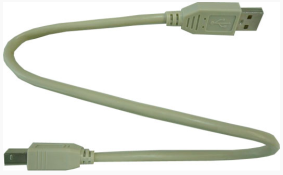
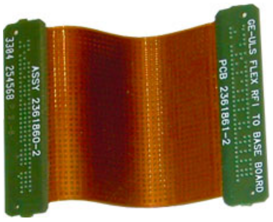
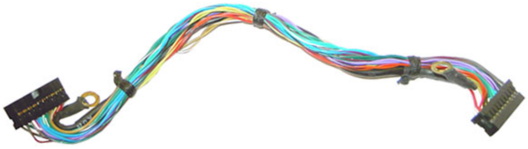
Item	Part Name	Part Number	Description	Qty	CRU	FRU
419	Cable Kit	KTZ280036	Cable Kit only used for Dock Cart (USB-Kabel (0,3m), Cabel Set DC Power Voluson i / Voluson eCart) 	1	N	1
420	Network Cable	KTZ280033	Network Cable only used for Dock Cart I 	1	N	1
421	VGA cable for Secondary Monitor	KTZ220527	VGA cable to connect Secondary Patient Monitor (15m)	1	Y	1
422	Cable Tree Voluson Station	KTZ301531	Cable Tree only used for Voluson Station (**USB-cable, VGA-cable, Audiocable,** DC-Power-cable, AC-Power-cable, Ground-cables) 	7	N	1
423	USB Cable Kit	KTZ280133	USB Cable Kit (4 pieces; 30cm, 40cm, 55cm, 90cm) only for Voluson Station 	4	Y	1
424	Cable Set LCD Display	KTZ280158	cable LCD to LED driver, cable Backlight Inverter/ Flexboard, Display Data Cables (6Bit-GPD5 and 8Bit-GPD6)	3	N	1

Table 9-8 Miscellaneous Cables

Item	Part Name	Part Number	Description	Qty	CRU	FRU
425	RBI to Base Board FLEX	KTZ220272	FLEX from RF-board (RBI) to Base Board 	1	N	1
426	Base Board to Keyboard cable	KTZ220331	Base Board to Keyboard cable 	1	N	1
427	HDD Copy Adapter	KTZ280219	SATA-Data cable 7pin,Power adapter cable 4pin, Converter-cable with USB-Power_Plug, power adaptor, power cord 	5	N	1

Section 9-9
Optional Peripherals and Accessories

Table 9-9 below outlines the optional peripherals and accessories described in the sub-sections.

Table 9-9 Optional Peripherals and Accessories - Replacement Parts

Sub-section	Description	Page Number
9-9-1	Recording Tools	9-26
9-9-2	Printers	9-27
9-9-3	Drives & additional Devices	9-29
9-9-4	Optional Equipment	9-31

9-9-1 Recording Tools

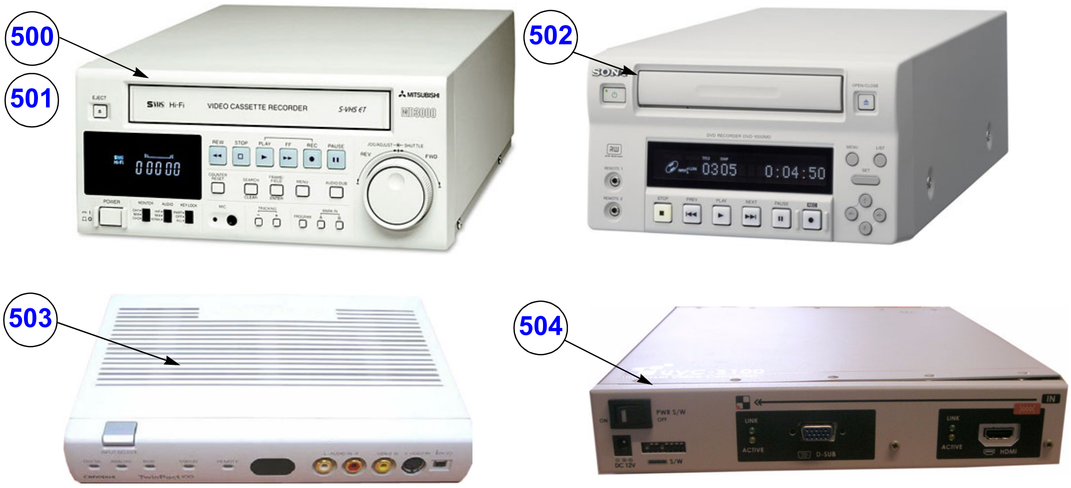


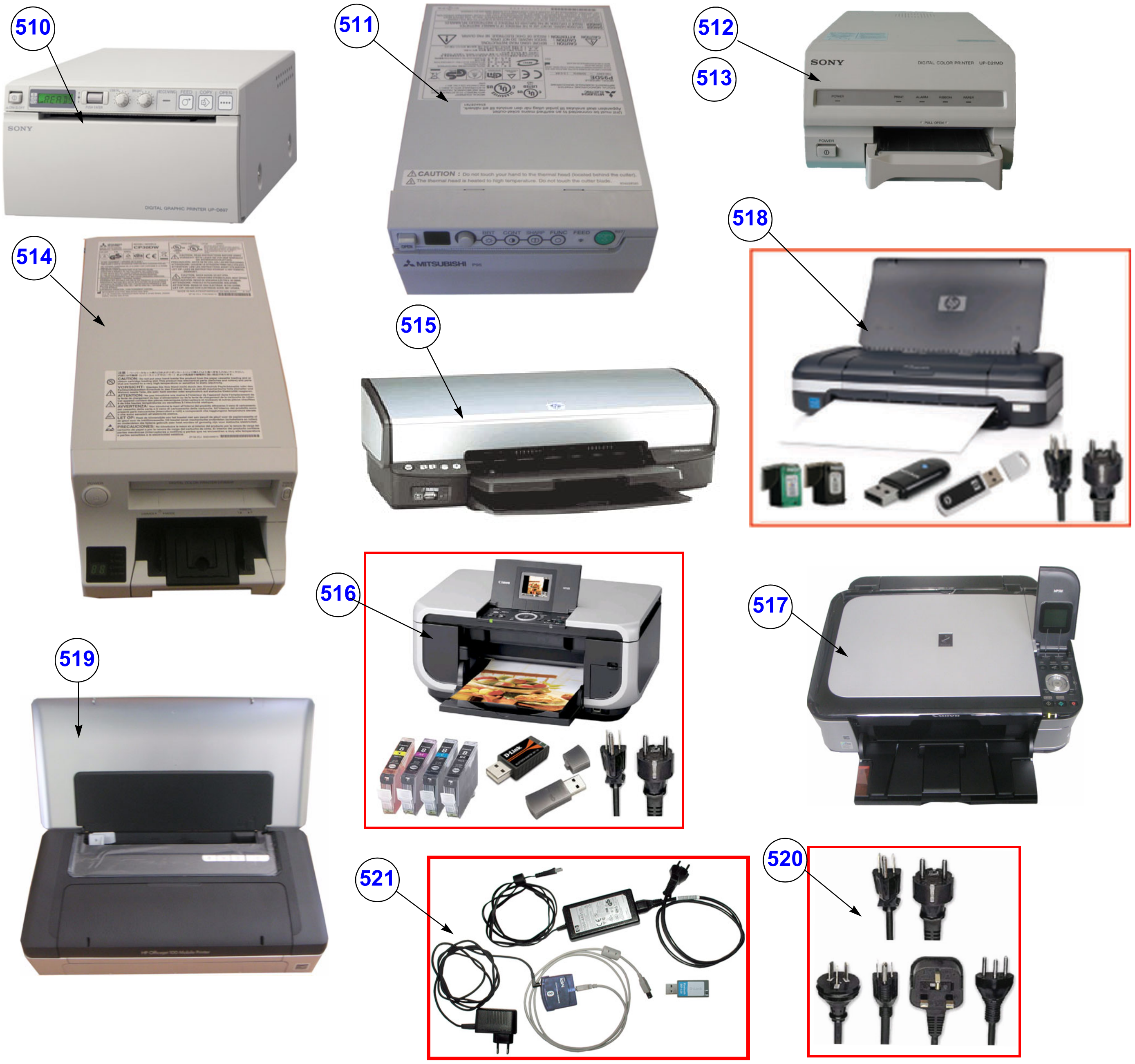
Figure 9-6 Optional Peripherals and Accessories - Recording Tools

Table 9-10 Optional Peripherals and Accessories - Recording Tools

Item	Part Name	Part Number	Description	Qty	CRU	FRU
500	S-VHS Medical Grade VCR - NTSC (Mitsubishi VCR HS-MD3000U)	KTZ211368 (H46801D)	NTSC (Video Converter required)	-	N	1
501	S-VHS Medical Grade VCR - PAL (Mitsubishi VCR HS-MD3000E)	KTZ211369 (H46801C)	PAL (Video Converter required)	-	N	1
502	DVD Recorder - PAL/NTSC (Sony DVO-1000MD)	KTZ154759 (H48651ND)	DVD Recorder (PAL/NTSC) (Video Converter required)	-	N	1
503	Video Scan Converter Kit	KTZ196266 (H48651TH)	Video Converter Canopus (VGA-to-video converter) incl. Medical Grade Power Supply	-	N	1
504	Video Scan Converter Ophit	KTZ196266 (H48691KF)	Video Scan Converter Compact Ophit incl. Medical Grade Power Supply	-	N	1

NOTE: *The illustrations may not correspond to the actual product!*

9-9-2 Printers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521

Figure 9-7 Optional Peripherals and Accessories - Printers

Table 9-11 Optional Peripherals and Accessories - Printers

Item	Part Name	Part Number	Description	Qty	CRU	FRU
510	Digital B/W Video Printer (Sony UP-D897)	KTZ220507 (H48651ML)	Digital Black&White Video Printer (USB-Port)	-	N	1
511	Mitsubishi B/W Printer P95D	KTZ302617 (H48681TH)	Mitsubishi B/W Printer P95D	-	N	1
512	Digital Color Printer (Sony UP-D23MD)	KTZ211373 (H46831B)	Digital Color Printer (USB-Port)	-	N	1
513	Digital Color Printer (Sony UP-D25MD)					
514	Mitsubishi Color Printer CP30D	KTZ302616 (H48681TJ)	Mitsubishi Color Printer CP30D	-	N	1
515	Line Printer Bluetooth (HP 5940)	KTZ220510 (H48651WE)	Line Printer Bluetooth (USB-Port) **without** cartridge (Bluetooth Connection Set KTZ196002 is required) can be replaced by Canon Printer KTZ300182	-	N	1
516	Line Printer Bluetooth (Canon Pixma MP600/MP610)	KTZ300182 (H48661MT)	Line Printer Bluetooth incl. Ink, Bluetooth Adapters + power cable US and EU (replaces HP 5940 printer - KTZ220510)	-	N	1
517	Line Printer Bluetooth (Canon Pixma MP550)		Line Printer Bluetooth incl. Ink, Bluetooth Adapters + power cable US and EU (replaces Canon MP600/MP610)			
518	Line Printer Bluetooth (e.g., HP Officejet H470)		Line Printer Bluetooth incl. Ink, Bluetooth Adapters + power cable US and EU	-	N	1
519	Line Printer Bluetooth (e.g., HP OfficeJet 100)		Line Printer Bluetooth incl. Ink, Bluetooth Adapters + power cable US and EU			
520	Line Printer Destination Set	KTZ280057 (H48661MW)	Line printer power cable set for US, EU and ROW (rest of world)	-	N	1
521	Bluetooth Connection Set	KTZ196002 (H46631M)	Bluetooth Connection Set	-	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-3 Drives & additional Devices

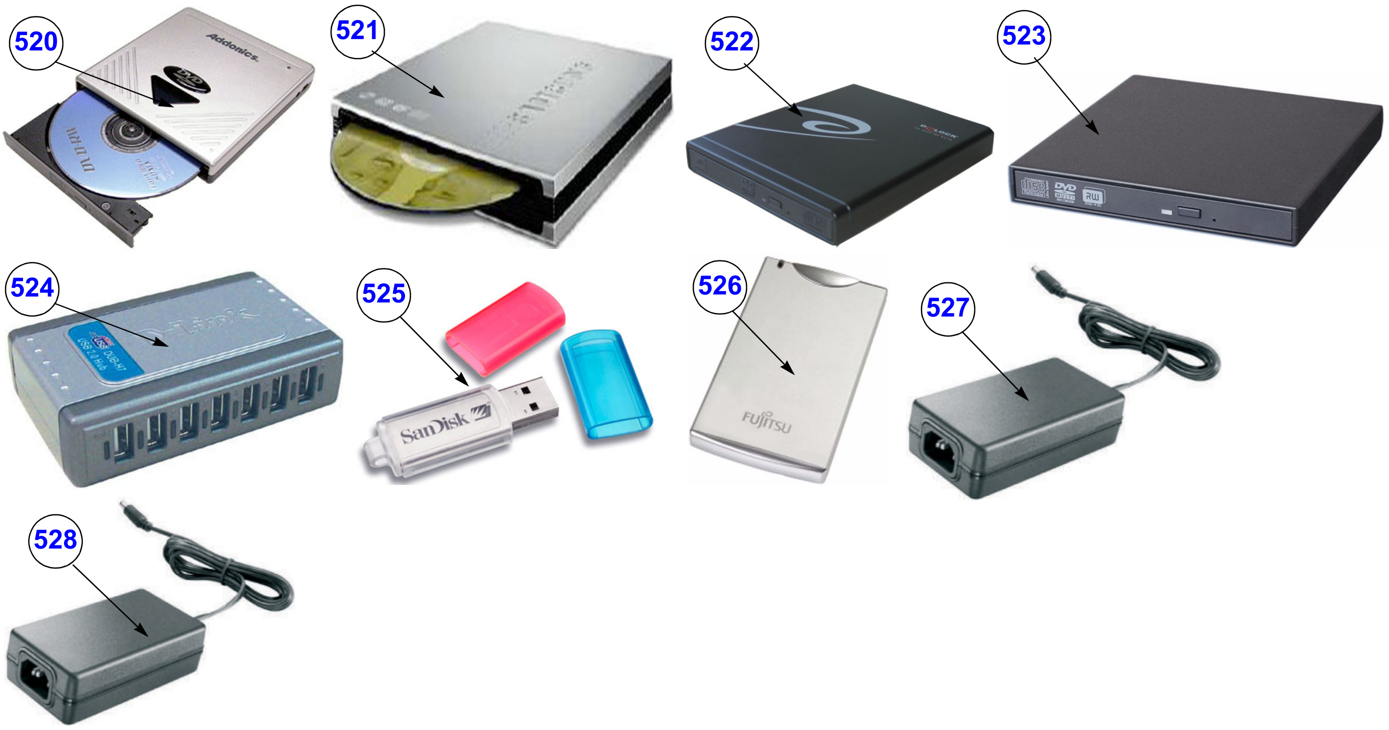


Figure 9-8 Optional Peripherals and Accessories - Drives & additional Devices

Table 9-12 Optional Peripherals and Accessories - Drives & additional Devices

Item	Part Name	Part Number	Description	Qty	CRU	FRU
520	portable DVD Drive (Writer)	KTZ196213	portable DVD/CD Drive (Writer) incl. Medical Grade Power Supply (Model Addonics)	1	N	1
521			portable DVD/CD Drive (Writer) incl. Medical Grade Power Supply (Model Samsung SE-T084) **Note:** Is applicable at Voluson i / Voluson e system with software higher than 6.1.0.			
522			portable DVD/CD Drive (Writer) incl. Medical Grade Power Supply (Model De Lock)			
523	portable DVD Writer 2	KTZ280218	portable DVD/CD Drive (Writer) incl. Medical Grade Power Supply (Model Teac) SW 7.1.4 and SW 8.2.1 Rev.C or higher is required	1	N	1
524	USB Hub (D-Link DUB-H7)	KTZ196267 (H48651TG)	septuple USB Hub incl. Medical Grade Power Supply	-	Y	1
525	USB Stick 512MB	2411544 (H45021G)	USB Flash Memory Stick (512 MB)	-	Y	1
526	USB external Hard disk drive	KTZ220680 (H48661DF)	USB “Handydrive” external Hard disk drive 640GB	-	Y	1
527	Medical Grade Power Supply 5V / 2.6A	KTZ220460	Medical Grade Power Supply 5V / 2.6A for DVD/CD Drive (Writer) and/or Video Converter	-	Y	1
528	Medical Grade Power Supply 5V / 6A	KTZ220623	Medical Grade Power Supply 5V / 6A for USB-Hub	-	Y	1

9-9-3 Drives & additional Devices (cont'd)

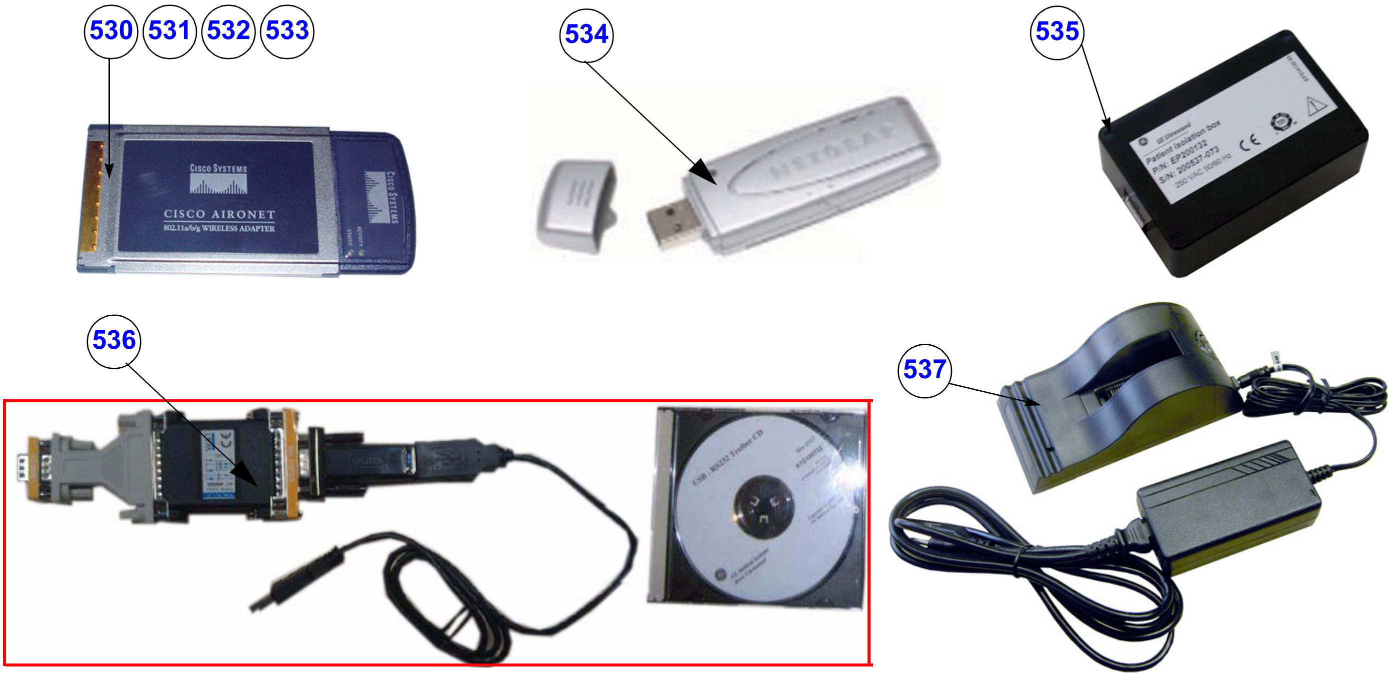


Figure 9-9 Optional Peripherals and Accessories - Drives & additional Devices cont´d

Table 9-13 Optional Peripherals and Accessories - Drives & additional Devices cont´d

Item	Part Name	Part Number	Description	Qty	CRU	FRU
530	Wireless Network Interface EU & MEA	KTZ196281 (H45021HW)	Wireless CardBus Network Adapter (PCMCIA) Europe & Middle East Africa	-	Y	1
531	Wireless Network Interface USA	KTZ196282 (H45021HT)	Wireless CardBus Network Adapter (PCMCIA) USA	-	Y	1
532	Wireless Network Interface JAPAN	KTZ196283 (H45021HY)	Wireless CardBus Network Adapter (PCMCIA) Japan	-	Y	1
533	Wireless Network Interface AOR	KTZ196284 (H45021HZ)	Wireless CardBus Network Adapter (PCMCIA) All Other Regions	-	Y	1
534	Wireless Network Interface	KTZ196269 H48671DT	Wireless Network Interface ("Netgear" WLAN Adapter) SW 7.1.4 and 8.2.0 Rev.B and higher is required	-	Y	1
535	LAN Isolation Box & Cable Kit	EP200132 (H45021EC)	LAN Patient Isolation Box & Cable Kit	-	Y	1
536	USB-RS232 Connection kit PRY	KTZ195858 (H46681S)	Converter from USB to RS-232 Serial Port (Connection Module - Report data)	-	N	1
537	Battery Charger	KTZ220725 (H48661DG)	external Battery Charger (only for KTZ220278 and KTZ302054)	-	Y	1

NOTE: The illustrations may not correspond to the actual product!

9-9-4 Optional Equipment

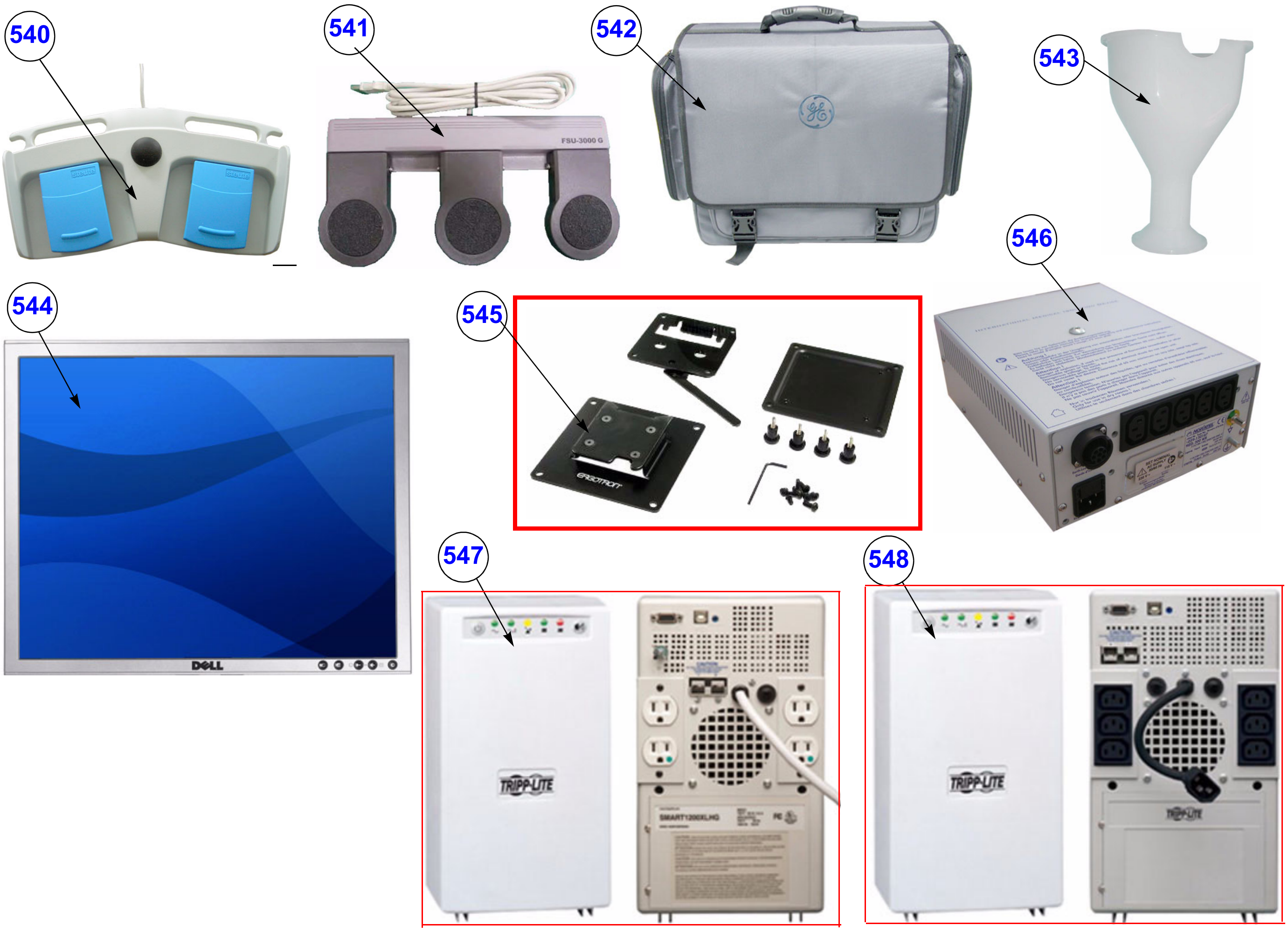

540
541
FSU-3000 G
542
543
546
544
DELL
545
ERGOTRON
547
TRIPP-LITE
SMART1200XLHG
548
TRIPP-LITE

Figure 9-10 Optional Peripherals and Accessories - Optional Equipment

NOTE: The illustrations may not correspond to the actual product!

Table 9-14 Optional Peripherals and Accessories - Optional Equipment

Item	Part Name	Part Number	Description	Qty	CRU	FRU
540	Footswitch	KTZ196270 H48651T ⇨ **BT Version**	Scan/Freeze Footswitch USB only applicable at Voluson i / Voluson e systems with software BT'07 and higher	-	Y	1
541	Footswitch 3 buttons	5380960 H48681WS	Footswitch 3 buttons only applicable at Voluson i / Voluson e systems with software CC200 Ext.0 and higher	-	Y	1
542	GoPack	H48651NM	Portable Case (Trolley)	-	Y	N
543	RIC-Holder	KTZ225469	Probe holder used for Real-time 4D endocavity probes (RIC) during disinfection process	-	Y	1
544	19" LCD Secondary Monitor	KTZ220525	19" LCD Secondary "Patient" Monitor **without** Wall Mount kit and Isolation Transformer	1	Y	2
545	Wall Mount kit for 19" LCD Secondary Monitor	KTZ220526	Wall Mount kit for 19" LCD Secondary Monitor	1	N	2
546	Isolation Transformer	KTZ220714	Isolation Transformer	1	Y	1
547	UPS Tripplite SMART1200XLHG	H48691PD	Medical-grade UPS protection with built-in line-interactive voltage regulation for 100V - 130V	1	Y	1
548	UPS Tripplite SMX1200XLHG	H48691PE	Medical-grade UPS protection with built-in line-interactive voltage regulation for 220V - 240V	1	Y	1

9-9-5 Optional Modo Cart

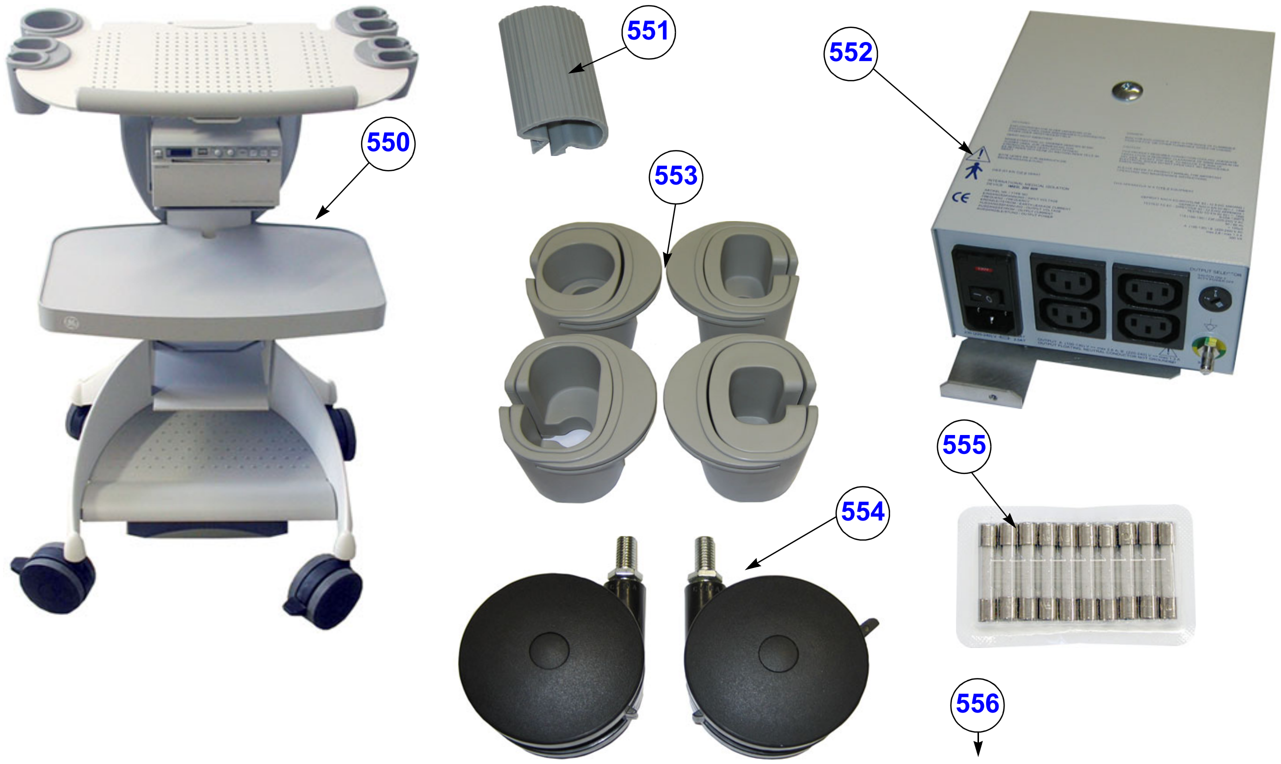


Figure 9-11 Modo Cart - Replacement parts

Table 9-15 Modo Cart - Replacement parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
550	Modo Cart (without peripherals)	KTZ196285 H48651TD	Modo Cart incl. isolation transformer, probe and gel holder, peripherals shelves, hand-rest and handles	-	Y	1
551	Cable Clip M-Cart	KTZ220885	Cable Clip M-Cart	2	Y	1
552	Isolation Transformer M-Cart	KTZ220714	Isolation Transformer (Power Supply) IMED300WR M-Cart	1	Y	1
553	Probe Holder Kit M-Cart	KTZ220886	Probe Holder Kit M-Cart	1	Y	1
554	Front and Rear Wheels M-Cart	KTZ220887	Front and Rear Wheels M-Cart	2	Y	1
555	Fuses M-Cart	KTZ196333	Fuses (10Stk. 4A/10Stk. 2A) for IMED300WR	-	Y	1
556	Screw Kit	KTZ280045	various screws	1	Y	1

NOTE: The illustrations may not correspond to the actual product!

9-9-6 Optional Dock Cart / Dock Cart light

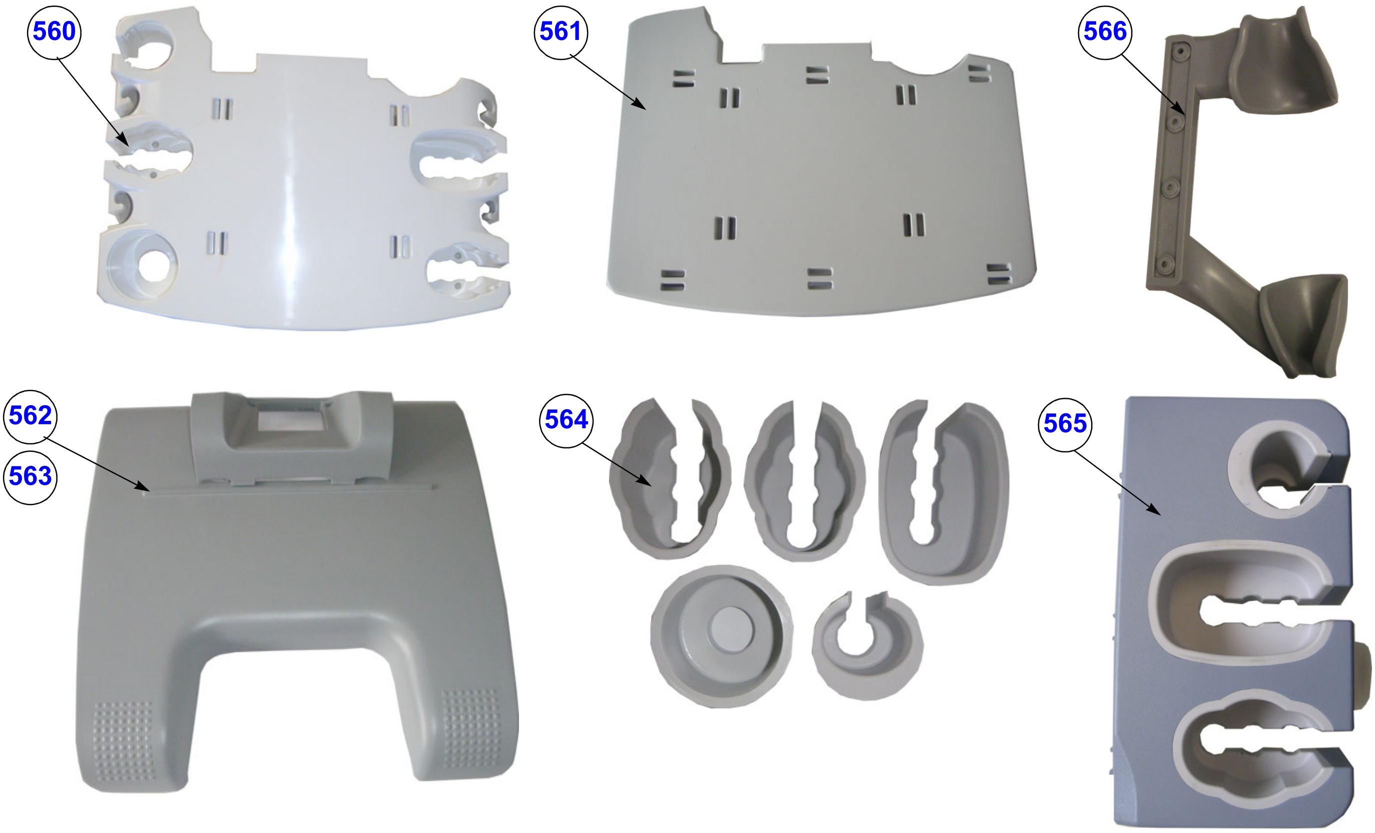


Figure 9-12 Dock Cart / Dock Cart light - Replacement parts

Table 9-16 Dock Cart / Dock Cart light - Replacement parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
560	Tray upper D-Cart / Dock Cart light	KTZ280021 H48671MP	Tray upper D-Cart / Dock Cart light	1	Y	1
561	Tray lower D-Cart / Dock Cart light	KTZ280020 H48671ZN	Tray lower D-Cart / Dock Cart light	1	Y	1
562	Cover Bottom gray D-Cart	KTZ280037	Cover Bottom gray D-Cart	2	Y	1
563	Cover Bottom blue D-Cart / Dock Cart light	KTZ280044	Cover Bottom blue D-Cart / Dock Cart light	2	Y	1
564	Probe Holder Kit D-Cart / Dock Cart light	KTZ280022	Probe Holder Kit D-Cart / Dock Cart light	1	Y	1
565	Probe Holder Top D-Cart / Dock Cart light	KTZ300716 H48671MM	Probe Holder Top D-Cart / Dock Cart light	1	Y	1
566	Probe Holder for Endocavity probes D-Cart / Dock Cart light	KTZ134657 H48671MN	Probe Holder for Endocavity probes D-Cart / Dock Cart light	1	Y	1

NOTE: The illustrations may not correspond to the actual product!

9-9-6 Optional Dock Cart / Dock Cart light (cont'd)

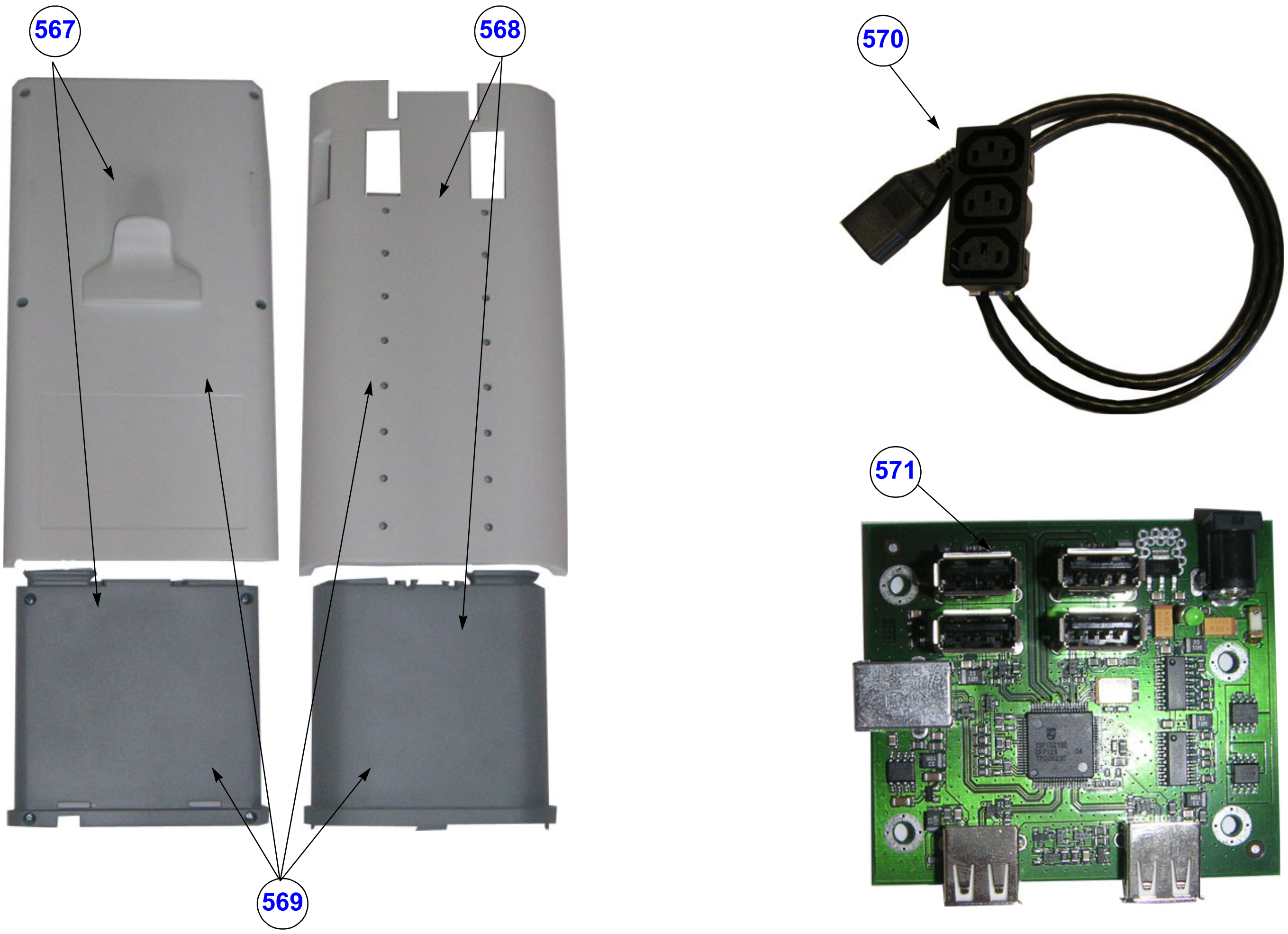


Figure 9-13 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Table 9-17 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
567	Back Column Cover gray D-Cart	KTZ280023	Back Column Cover gray D-Cart	2	N	1
568	Front Column Cover gray D-Cart	KTZ280024	Front Column Cover gray D-Cart	2	N	1
569	Column Cover complete blue D-Cart / Dock Cart light	KTZ280068	Column Cover complete blue D-Cart / Dock Cart light	4	N	1
570	Power Distribution D-Cart / Dock Cart light	KTZ280030	Power Distribution (incl. cable Kit) D-Cart / Dock Cart light	1	N	1
571	HUB D-Cart / Voluson Station	KTZ280029	HUB (internal) D-Cart / Voluson Station	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-6 Optional Dock Cart / Dock Cart light (cont'd)

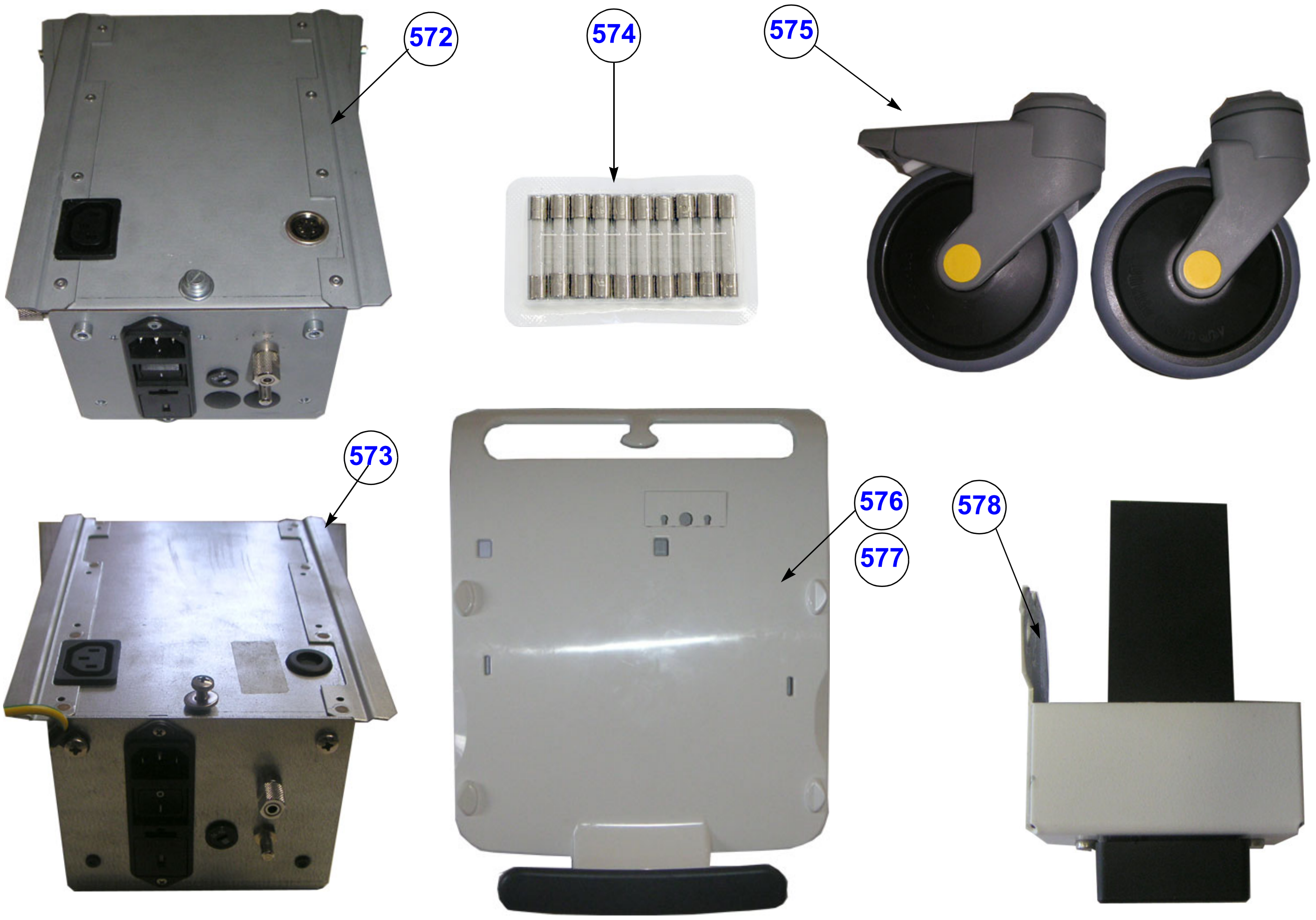


Figure 9-14 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Table 9-18 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
572	Power Supply D-Cart / Voluson Station	KTZ280031	GPN1, 2, 10 Power Supply D-Cart / Voluson Station	1	N	1
573	Power Supply D-Cart-Light	KTZ301404	GPN5 Power Supply D-Cart-Light	1	N	1
574	Fuse Set D-Cart / Dock Cart light	KTZ280032	Fuse Set (10Stk. 5A.) D-Cart / Dock Cart light	1	Y	1
575	Front and Rear wheels D-Cart / Dock Cart light	KTZ280019	Front and Rear wheels D-Cart / Dock Cart light	2	Y	1
576	Mounting Platform gray D-Cart	KTZ280026	Mounting Platform (Cover) gray D-Cart	1	N	1
577	Mounting Platform blue D-Cart / Dock Cart light	KTZ280069	Mounting Platform (Cover) blue D-Cart / Dock Cart light	1	N	1
578	LAN Isolation Box, Tray D-Cart	KTZ280027	LAN Isolation Box, Tray D-Cart	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-6 Optional Dock Cart / Dock Cart light (cont'd)

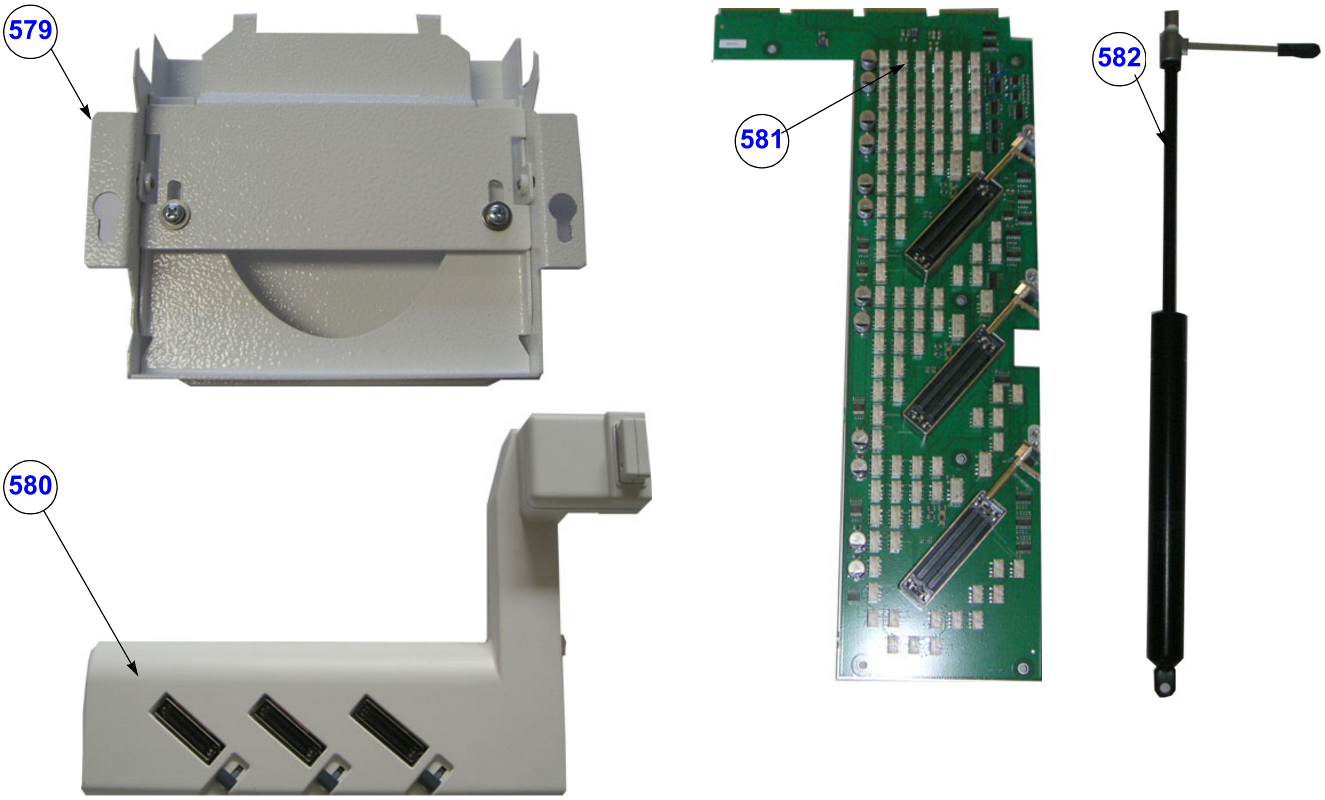


Figure 9-15 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Table 9-19 Dock Cart / Dock Cart light - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
579	Tray Recorder D-Cart	KTZ280028	Tray Recorder D-Cart	1	N	1
580	Probe Mux Box D-Cart	KTZ280035	Probe Mux Box D-Cart (with SN BC11000 and higher you can upgrade the Dock Cart light with the Probe Mux Box)	1	N	1
581	RPE2.P2 Probe Control D-Cart / Voluson Station	KTZ280017	RPE2.P2 Probe Control D-Cart / Voluson Station	1	N	1
582	Gas Spring Replacement Kit D-Cart	KTZ280025	Gas Spring Replacement Kit D-Cart	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-7 Optional Voluson Station

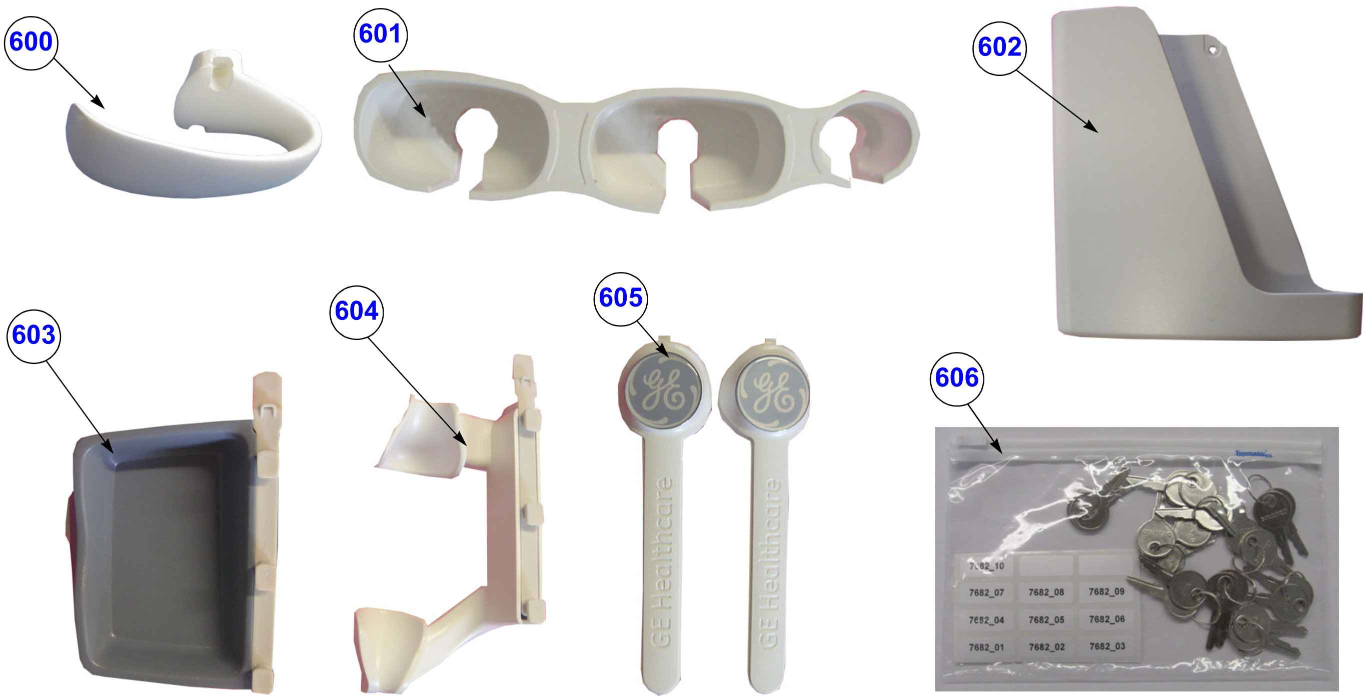


Figure 9-16 Voluson Station - Replacement parts

Table 9-20 Voluson Station - Replacement parts

Item	Part Name	Part Number	Description	Qty	CRU	FRU
600	Cable Holder	KTZ134656	Probe Cable Holder (1 pcs.) for Voluson E8	2	Y	1
601	Probe Holder Insert	KTZ301238	Probe Holder Insert	1	Y	1
602	Storage Tray Back	KTZ301245	Storage Tray Back	1	Y	1
603	Gel Condom Holder	KTZ301311 H48671YW	Gel Condom Holder	1	Y	1
604	Probe Holder for Endocavity Probes	KTZ280136 H48671YY	Probe Holder for Endocavity Probes	1	Y	1
605	Column Label Cover	KTZ280138	Column Label Cover right and left	2	N	1
606	Voluson Station Keys	KTZ280206	Voluson Station Keys	N	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-7 Optional Voluson Station (cont'd)

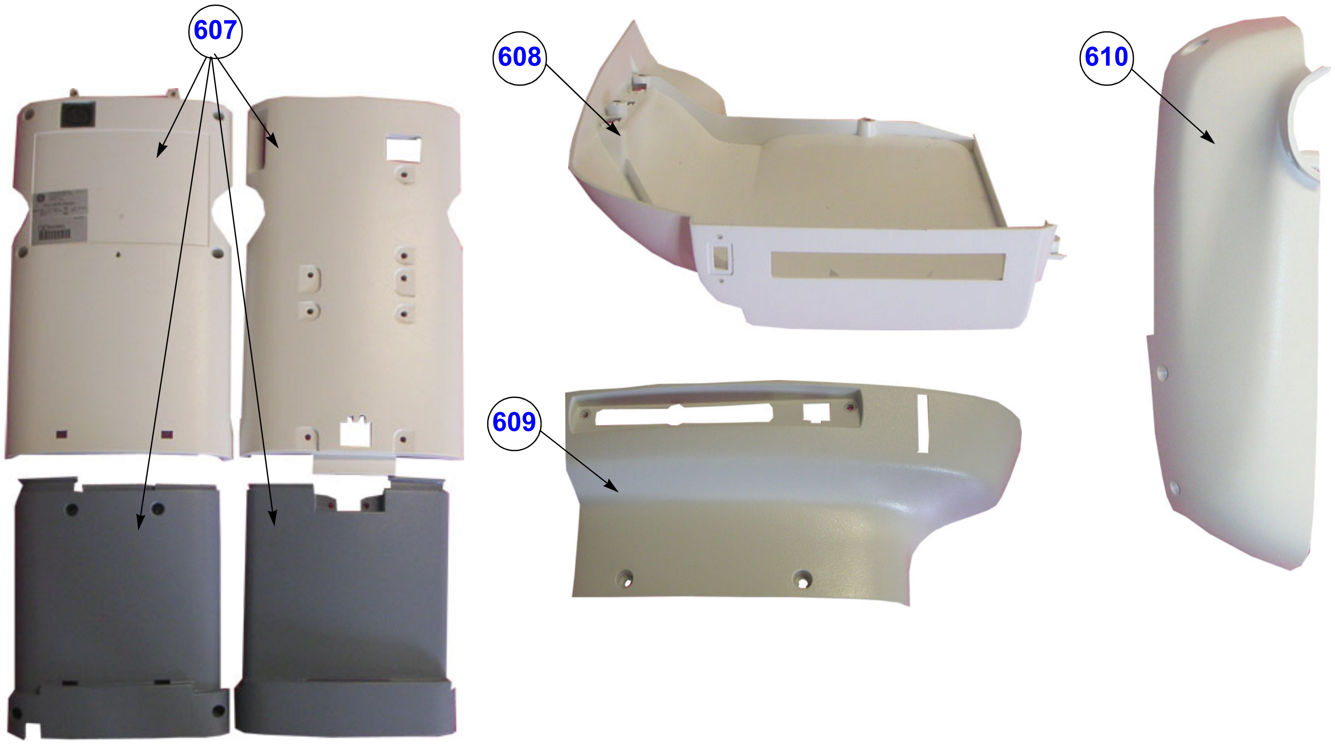


Figure 9-17 Voluson Station - Replacement parts (cont'd)

Table 9-21 Voluson Station - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
607	Column Cover complete Voluson Station	KTZ280137	Column Cover complete Voluson Station	4	N	1
608	Top Shelf Bottom Front Cover	KTZ301228	Top Shelf Bottom Front Cover	1	N	1
609	Top Shelf Bottom Rear Cover	KTZ301229	Top Shelf Bottom Rear Cover	1	N	1
610	Top Shelf Additional Bottom Cover	KTZ301230	Top Shelf Additional Bottom Cover	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-7 Optional Voluson Station (cont'd)

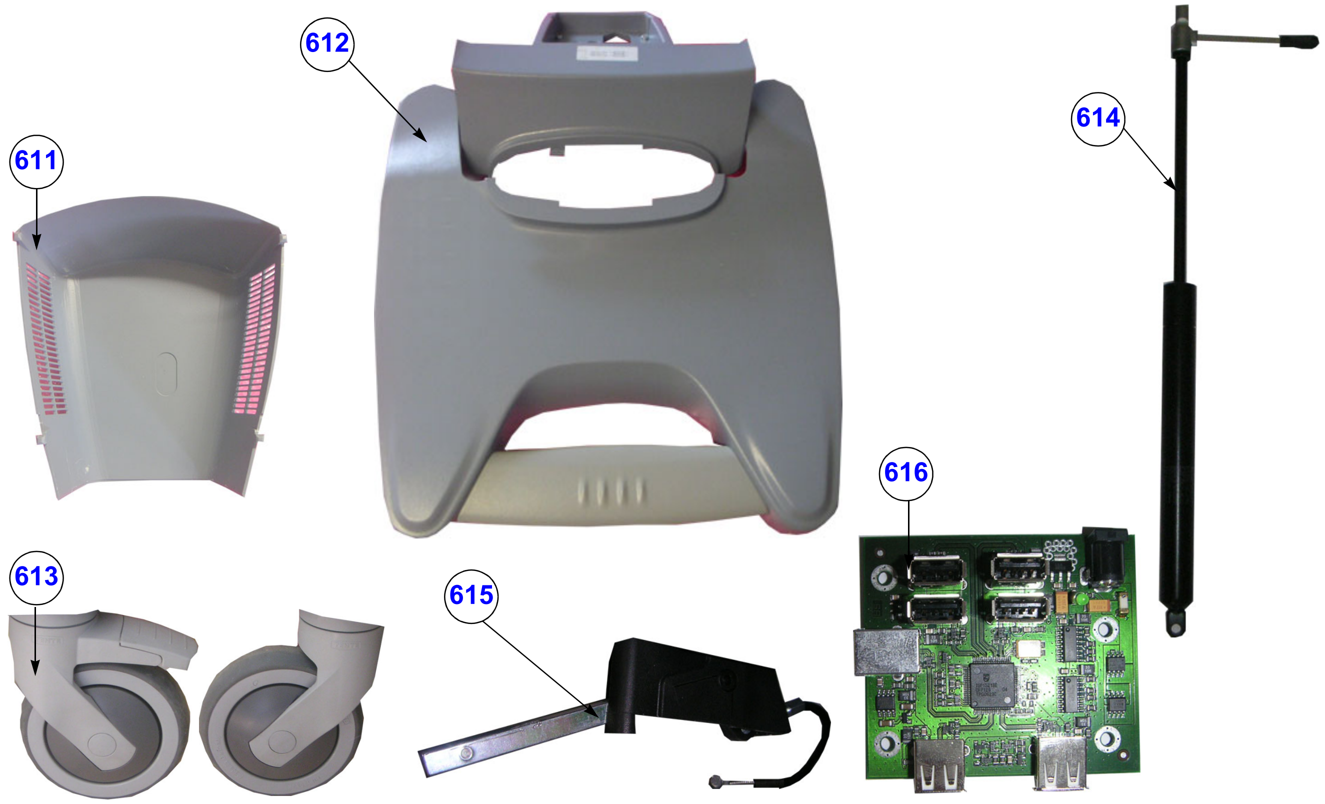


Figure 9-18 Voluson Station - Replacement parts (cont'd)

Table 9-22 Voluson Station - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
611	Power Supply Bottom Cover	KTZ301222	Power Supply Bottom Cover	1	N	1
612	Cover Bottom Voluson Station	KTZ280145	Cover Bottom Voluson Station	2	N	1
613	Front and Rear Wheels	KTZ280146	Front and Rear Wheels Voluson Station	2	Y	1
614	Gas Spring Replacement Kit	KTZ280140	Gas Spring Replacement Kit	1	N	1
615	Bowden Cable Kit	KTZ280141	Bowden Cable Kit	1	N	1
616	HUB D-Cart / Voluson Station	KTZ280029	HUB (internal) D-Cart / Voluson Station	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-7 Optional Voluson Station (cont'd)

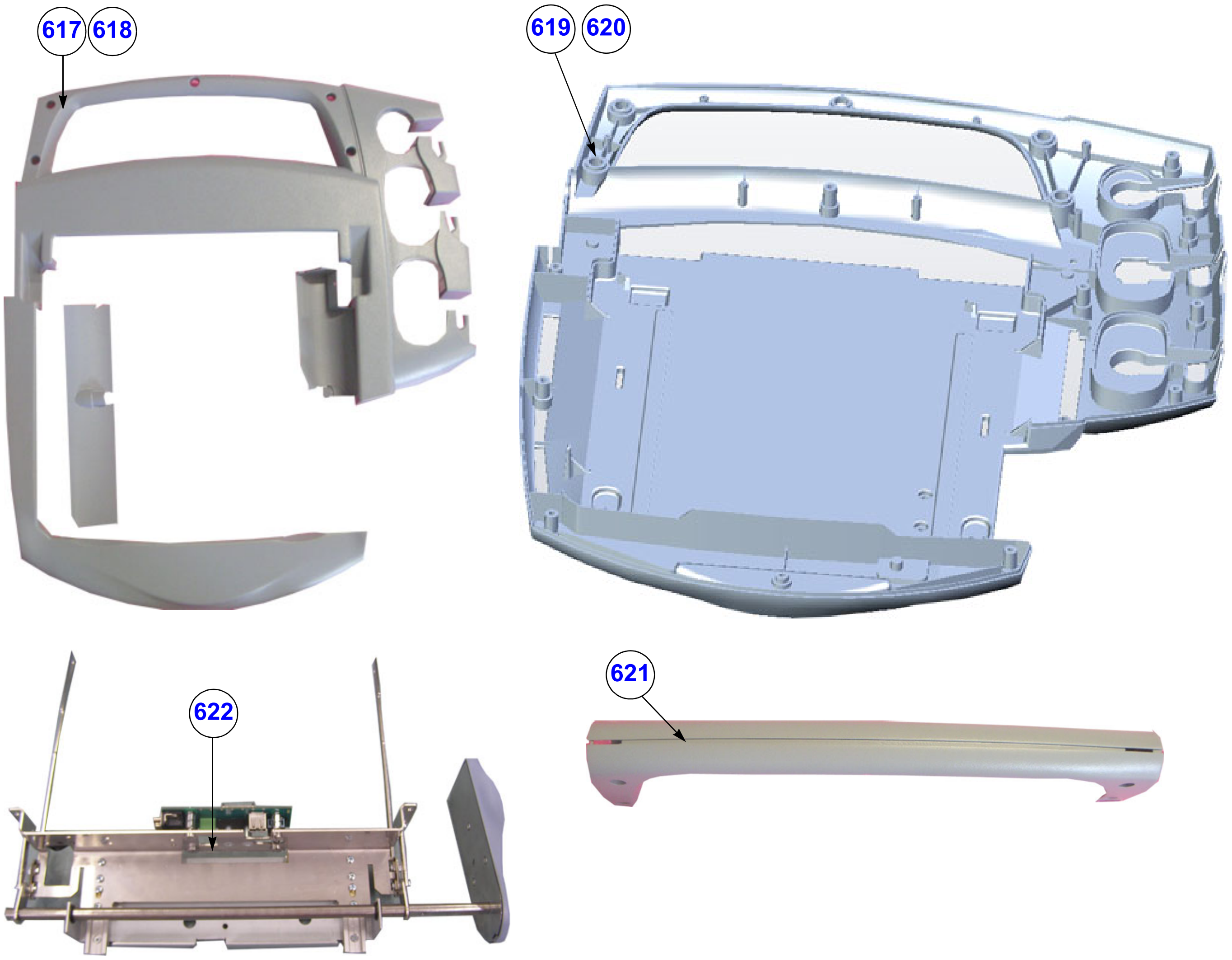


Figure 9-19 Voluson Station - Replacement parts (cont'd)

Table 9-23 Voluson Station - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
617	Operating Panel Top	KTZ280134	Operating Panel Top incl. Air In and Air Outlet	3	N	1
618	Operating Panel Top 2	KTZ301761	Operating Panel Top 2 incl. Air In and Air Outlet	3	N	3
619	Operating Panel Bottom	KTZ301176	Operating Panel Bottom	1	N	1
620	Operating Panel Bottom 2	KTZ301758	Operating Panel Bottom 2	1	N	1
621	Back Handle complete	KTZ280135	Back Handle complete	2	N	1
622	Release Assembly	KTZ280148	Release Assembly	1	N	1

NOTE: The illustrations may not correspond to the actual product!

9-9-7 Optional Voluson Station (cont'd)

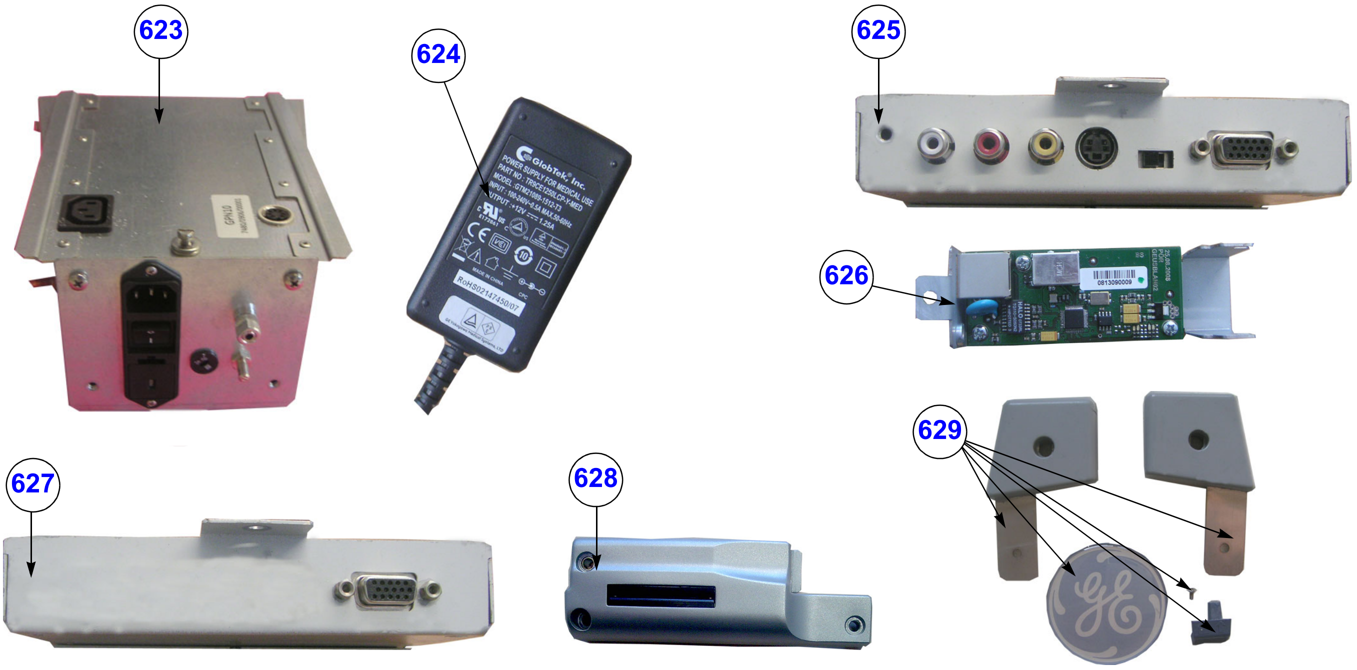


Figure 9-20 Voluson Station - Replacement parts (cont'd)

Table 9-24 Voluson Station - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
623	Power Supply Voluson Station / D-Cart	KTZ280031	GPN1, 2, 10 Power Supply Voluson Station / D-Cart	1	N	1
624	Power Supply Patient Monitor	KTZ300405	Power Supply Patient Monitor	1	N	1
625	Image Resizer Box Voluson Station	KTZ280147 H48671ZC	Image Resizer Box Voluson Station	1	N	1
626	LAN Connector	KTZ301362	LAN Connector	1	N	1
627	VGA Connector	KTZ301212	VGA Connector	1	N	1
628	Docking Adapter	KTZ301360 H48681BA	Docking Adapter	1	N	1
629	small parts kit Voluson Station	KTZ280139	Patient Monitor Adapter right and left Probe Locker (4 pieces) screws for Probe Locker (4 pieces) Label GE Logo DM60mm (3 pieces)	13	N	1

NOTE: *The illustrations may not correspond to the actual product!*

9-9-7 Optional Voluson Station (cont'd)

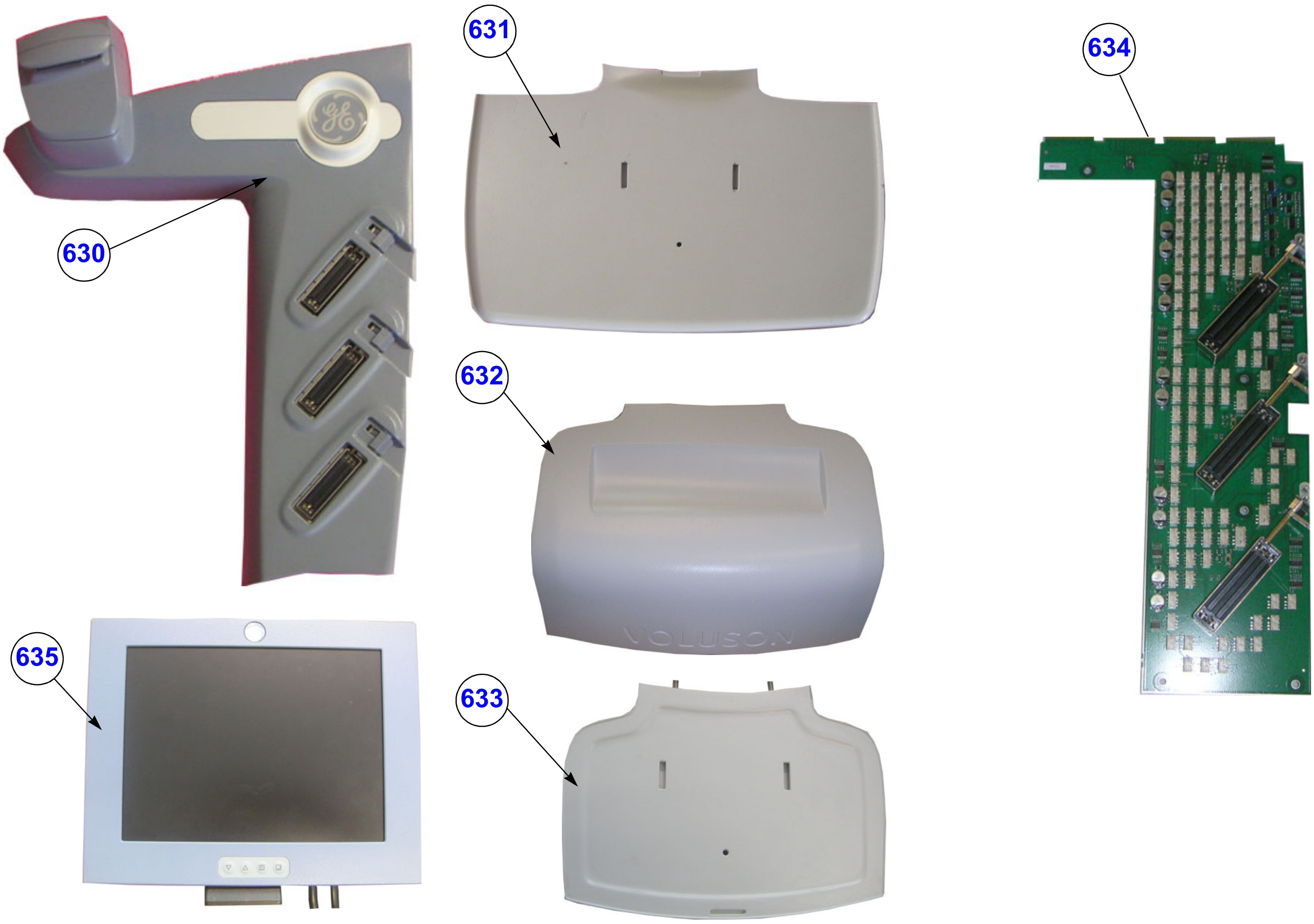


Figure 9-21 Voluson Station - Replacement parts (cont'd)

Table 9-25 Voluson Station - Replacement parts (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
630	Probe Mux Box Voluson Station	KTZ280149 H48681AL	Probe Mux Box Voluson Station	1	N	1
631	Additional Shelf Peripherals	KTZ280142 H48671YZ	Additional Shelf Peripherals	1	Y	1
632	Cover BW Printer Shelf	KTZ280143	Cover BW Printer Shelf	1	Y	1
633	Console Bottom Shelf	KTZ280144	Console Bottom Shelf	1	Y	1
634	RPE2.P2 Probe Control Voluson Station / D-Cart	KTZ280017	RPE2.P2 Probe Control Voluson Station / D-Cart	1	N	1
635	Patient Monitor 8”	KTZ301405 H48671ZB	Patient Monitor 8”	1	Y	1

NOTE: The illustrations may not correspond to the actual product!

Section 9-10
System Manuals

Table 9-26 System Manuals - Voluson i

Part Name	Part# / Kretz# BT'06	Part# / Kretz# BT'07	Part# / Kretz# BT'09	Part# / Kretz# BT'11
Voluson i / Voluson e Service Manual	KTI106052	KTI106052	KTI106052	KTI106052
System User Manuals				
Basic User Manual, Voluson i, English	H48651LB KTI106029	H48661AF KTI106120	H48671HD KTD100812	H48671HD
Basic User Manual, Voluson i, German	H48651LC KTI106036	H48661AG KTI106114	H48671HE KTD100813	H48671HE
Basic User Manual, Voluson i, Spanish	H48651LD KTI106037	H48661AH KTI106122	H48671HF KTD100814	H48671HF
Basic User Manual, Voluson i, Portuguese	H48651LE KTI106030	H48661AJ KTI106123	H48671HH KTD100815	H48671HH
Basic User Manual, Voluson i, Italian	H48651LF KTI106038	H48661AK KTI106124	H48671HJ KTD100816	H48671HJ
Basic User Manual, Voluson i, French	H48651LG KTI106039	H48661AL KTI106125	H48671HK KTD100817	H48671HK
Basic User Manual, Voluson i, Chinese	H48651LH KTI106040	H48661AM KTI106126	H48671HL KTD100818	H48671HL
Basic User Manual, Voluson i, Japanese	H48651LJ KTI106041	H48661AN KTI106127	H48671HM KTD100819	H48671HM
Basic User Manual, Voluson i, Mandarin TR	H48651LK KTI106042	H48661AP KTI106128	H48671HN KTD100820	-
Basic User Manual, Voluson i, Danish	H48651LL KTI106043	H48661AR KTI106129	H48671HP KTD100821	H48671HP
Basic User Manual, Voluson i, Dutch	H48651LM KTI106044	H48661AS KTI106130	H48671HR KTD100822	H48671HR
Basic User Manual, Voluson i, Finnish	H48651LN KTI106045	H48661AT KTI106131	H48671HS KTD100823	H48671HS
Basic User Manual, Voluson i, Greek	H48651LP KTI106046	H48661AW KTI106132	H48671HT KTD100824	H48671HT
Basic User Manual, Voluson i, Norwegian	H48651LR KTI106047	H48661AY KTI106133	H48671HW KTD100825	H48671HW
Basic User Manual, Voluson i, Polish	H48651LS KTI106048	H48661AZ KTI106134	H48671HY KTD100826	H48671HY
Basic User Manual, Voluson i, Russian	H48651LT KTI106054	H48661B KTI106135	H48671HZ KTD100827	H48671HZ
Basic User Manual, Voluson i, Swedish	H48651LW KTI106049	H48661BA KTI106136	H48671JA KTD100828	H48671JA
Basic User Manual, Voluson i, Turkish	H48651LY KTI106050	H48661BB KTI106137	H48671JB KTD100829	H48671JB
Basic User Manual, Voluson i, Czech	H48661LB KTI106090	H48661BC KTI106138	H48671JC KTD100830	H48671JC

Table 9-26 System Manuals - Voluson i

Part Name	Part# / Kretz# BT'06	Part# / Kretz# BT'07	Part# / Kretz# BT'09	Part# / Kretz# BT'11
Basic User Manual, Voluson i, Hungarian	H48661LA KTI106091	H48661BD KTI106139	H48671JD KTD100831	H48671JD
Basic User Manual, Voluson i, Latvian	H48661LC KTI106092	H48661BE KTI106140	H48671JE KTD100832	H48671JE
Basic User Manual, Voluson i, Lithuanian	H48661LD KTI106093	H48661BF KTI106141	H48671JF KTD100833	H48671JF
Basic User Manual, Voluson i, Esthonian	-	H48661BG KTI106142	H48671JG KTD100834	H48671JG
Basic User Manual, Voluson i,Slovakian	-	H48661BH KTI106143	H48671JH KTD100835	H48671JH
Basic User Manual, Voluson i, Romanian	-	H48661BJ KTI106144	H48671JJ KTD100836	H48671JJ
Basic User Manual, Voluson i, Bulgarian	-	-	H48671JK KTD100839	H48671JK
Basic User Manual, Voluson i, Korean	-	H48661BL KTI106145	H48671JL KTD100837	H48671JL
Basic User Manual, Voluson i, Croatia	-	-	H48671JM KTD101009	H48671JM
Basic User Manual, Voluson i, Slovenian	-	-	-	H48681KL
Basic User Manual, Voluson i, Serbian	-	-	H48671JN KTD100838	H48671JN
Basic User Manual, Voluson i, Indonesian	-	-	-	H48681SN
Basic User Manual, Voluson i, Portuguese europe	-	-	H48671HG KTD100840	-
Basic User Manual, Dock Cart , USA, Asia, main EU	-	-	H48671WK	H48671ZS
Basic User Manual, Dock Cart , Middle, Southern EU, Baltic	-	-	H48671WL	H48671ZT
Basic User Manual, Dock Cart , Eastern EU	-	-	H48671WM	H48671ZW
Basic User Manual, Dock Cart light, USA, Asia, main EU	-	-	H48671ZS	-
Basic User Manual, Dock Cart light, Middle, Southern EU, Baltic	-	-	H48671ZT	-
Basic User Manual, Dock Cart light, Eastern EU	-	-	H48671ZW	-
Basic User Manual, Voluson Station , USA, Asia, main EU	-	-	H48671ZD	H48671ZD
Basic User Manual, Voluson Station,Middle,Southern EU, Baltic	-	-	H48671ZE	H48671ZE
Basic User Manual, Voluson Station , Eastern EU	-	-	H48671ZF	H48671ZF
Advanced Reference Manual Voluson i / Voluson e, English	H48651NL KTI106055	H48661EA KTI106171	H48661EA KTI106171	H48661EA

Section 9-10 System Manuals (cont'd)

Table 9-27 System Manuals - Voluson e

Part Name	Part# / Kretz# BT'06	Part# / Kretz# BT'07	Part# / Kretz# BT'09	Part# / Kretz# BT'11
Voluson i / Voluson e Service Manual	KTI106052	KTI106052	KTI106052	KTI106052
System User Manuals				
Basic User Manual, Voluson e, English	H48661ME KTI106094	H48651WR KTI106121	H48671GE KTD100841	H48671GE
Basic User Manual, Voluson e, German	H48661MG KTI106095	H48651WS KTI106146	H48671GF KTD100842	H48671GF
Basic User Manual, Voluson e, Spanish	H48661MS KTI106096	H48651WT KTI106147	H48671GH KTD100843	H48671GH
Basic User Manual, Voluson e, Portuguese	KTI106097	H48651WW KTI106148	H48671GK KTD100844	H48671GK
Basic User Manual, Voluson e, Italian	H48661MA KTI106098	H48651WY KTI106149	H48671GL KTD100845	H48671GL
Basic User Manual, Voluson e, French	H48661MF KTI106099	H48651W KTI106150	H48671GM KTD100846	H48671GM
Basic User Manual, Voluson e, Chinese	KTI106100	H48651Y KTI106151	H48671GN KTD100847	H48671GN
Basic User Manual, Voluson e, Japanese	H486661MJ KTI106101	H48651YA KTI106152	H48671GP KTD100848	H48671GP
Basic User Manual, Voluson e, Mandarin TR	-	H48651YB KTI106153	H48671GR KTD100849	-
Basic User Manual, Voluson e, Danish	-	H48651YC KTI106154	H48671GS KTD100850	H48671GS
Basic User Manual, Voluson e, Dutch	-	H48651YD KTI106155	H48671GT KTD100851	H48671GT
Basic User Manual, Voluson e, Finnish	-	H48651YE KTI106156	H48671GW KTD100852	H48671GW
Basic User Manual, Voluson e, Greek	-	H48651YF KTI106157	H48671GY KTD100853	H48671GY
Basic User Manual, Voluson e, Norwegian	-	H48651YG KTI106158	H48671GZ KTD100854	H48671GZ
Basic User Manual, Voluson e, Polish	H486661MP KTI106111	H48651YH KTI106159	H48681HA KTD100855	H48681HA
Basic User Manual, Voluson e, Russian	H486661MR KTI106112	H48651YJ KTI106160	H48681HB KTD100856	H48681HB
Basic User Manual, Voluson e, Swedish	-	H48651YK KTI106161	H48681HC KTD100857	H48681HC
Basic User Manual, Voluson e, Turkish	-	H48651YL KTI106162	H48681HD KTD100858	H48681HD
Basic User Manual, Voluson e, Czech	-	H48651YM KTI106163	H48681HE KTD100859	H48681HE

Table 9-27 System Manuals - Voluson e

Part Name	Part# / Kretz# BT'06	Part# / Kretz# BT'07	Part# / Kretz# BT'09	Part# / Kretz# BT'11
Basic User Manual, Voluson e, Hungarian	-	H48651YN KTI106164	H48681HF KTD100860	H48681HF
Basic User Manual, Voluson e, Latvian	-	H48651YP KTI106165	H48681HG KTD100861	H48681HG
Basic User Manual, Voluson e, Lithuanian	-	H48651YR KTI106166	H48681HH KTD100862	H48681HH
Basic User Manual, Voluson e, Esthonian	-	H48651YS KTI106167	H48681HJ KTD100863	H48681HJ
Basic User Manual, Voluson e,Slovakian	-	H48651YT KTI106168	H48681HK KTD100864	H48681HK
Basic User Manual, Voluson e, Romanian	-	H48651YW KTI106169	H48681HM KTD100865	H48681HM
Basic User Manual, Voluson e, Bulgarian	-	-	H48681HL KTD100868	H48681HL
Basic User Manual, Voluson e, Korean	-	H48651YZ KTI106170	H48681HN KTD100866	H48681HN
Basic User Manual, Voluson e, Croatia	-	-	H48681HP KTD101017	H48681HP
Basic User Manual, Voluson e, Slovenian	-	-	-	H48681KK
Basic User Manual, Voluson e, Serbian	-	-	H48681HR KTD100867	H48681HR
Basic User Manual, Voluson e, Indonesian	-	-	-	H48681SP
Basic User Manual, Voluson e, Portuguese europe	-	-	H48671GJ KTD100869	-
Basic User Manual, Dock Cart , USA, Asia, main EU	-	-	H48671WK	H48671ZS
Basic User Manual, Dock Cart , Middle, Southern EU, Baltic	-	-	H48671WL	H48671ZT
Basic User Manual, Dock Cart , Eastern EU	-	-	H48671WM	H48671ZW
Basic User Manual, Dock Cart light, USA, Asia, main EU	-	-	H48671ZS	-
Basic User Manual, Dock Cart light, Middle, Southern EU, Baltic	-	-	H48671ZT	-
Basic User Manual, Dock Cart light, Eastern EU	-	-	H48671ZW	-
Basic User Manual, Voluson Station , USA, Asia, main EU	-	-	H48671ZD	H48671ZD
Basic User Manual, Voluson Station , Middle, Southern EU, Baltic	-	-	H48671ZE	H48671ZE
Basic User Manual, Voluson Station , Eastern EU	-	-	H48671ZF	H48671ZF
Advanced Reference Manual Voluson i / Voluson e, English	H48651NL KTI106055	H48661EA KTI106171	H48661EA KTI106171	H48661EA

Section 9-10 System Manuals (cont'd)

Table 9-28 System Manuals - Voluson i/e CC200

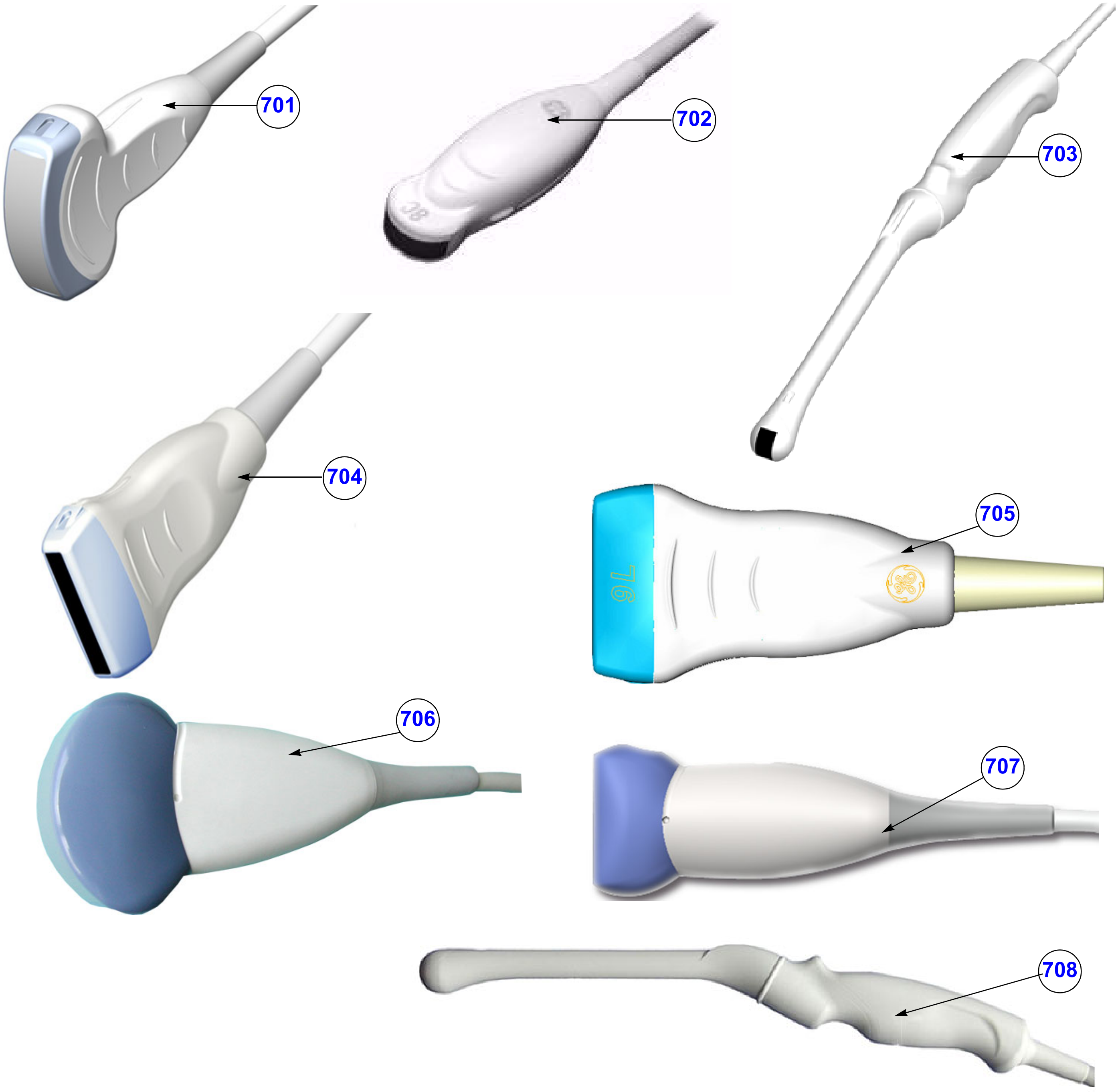
Part Name	Part# / Kretz# BT'14
Voluson i / Voluson e Service Manual	KTI106052
System User Manuals	
Basic User Manual, Voluson i/e, CC200, English	H48691LU
Basic User Manual, Voluson i/e, CC200, German	H48691LW
Basic User Manual, Voluson i/e, CC200, Spanish	H48691LX
Basic User Manual, Voluson i/e, CC200, Portuguese Brazil	H48691MA
Basic User Manual, Voluson i/e, CC200, Portuguese europe	H48691MB
Basic User Manual, Voluson i/e, CC200, Italian	H48691LY
Basic User Manual, Voluson i/e, CC200, French	H48691LZ
Basic User Manual, Voluson i/e, CC200, Chinese	H48691NA
Basic User Manual, Voluson i/e, CC200, Japanese	H48691MY
Basic User Manual, Voluson i/e, CC200, Danish	H48691MC
Basic User Manual, Voluson i/e, CC200, Dutch	H48691MD
Basic User Manual, Voluson i/e, CC200, Finnish	H48691ME
Basic User Manual, Voluson i/e, CC200, Greek	H48691MF
Basic User Manual, Voluson i/e, CC200, Norwegian	H48691MG
Basic User Manual, Voluson i/e, CC200, Russian	H48691MH
Basic User Manual, Voluson i/e, CC200, Swedish	H48691MJ
Basic User Manual, Voluson i/e, CC200, Turkish	H48691MK
Basic User Manual, Voluson i/e, CC200, Czech	H48691ML
Basic User Manual, Voluson i/e, CC200, Hungarian	H48691MM
Basic User Manual, Voluson i/e, CC200, Latvian	H48691MN
Basic User Manual, Voluson i/e, CC200, Lithuanian	H48691MP
Basic User Manual, Voluson i/e, CC200, Estonian	H48691MR
Basic User Manual, Voluson i/e, CC200, Slovakian	H48691MS
Basic User Manual, Voluson i/e, CC200, Romanian	H48691MT
Basic User Manual, Voluson i/e, CC200, Bulgarian	H48691MU
Basic User Manual, Voluson i/e, CC200, Croatian	H48691MW
Basic User Manual, Voluson i/e, CC200, Serbian	H48691MX

Table 9-28 System Manuals - Voluson i/e CC200

Part Name	Part# / Kretz# BT'14
Basic User Manual, Voluson i/e, CC200, Japanese	H48691MY
Basic User Manual, Voluson i/e, CC200, Korean	H48691MZ
Basic User Manual, Voluson i/e, CC200, Chinese	H48691NA
Basic User Manual, Voluson i/e, CC200, Indonesian	H48691NB
Basic User Manual, Voluson i/e, CC200, Slovenian	H48691NC
Basic User Manual, Voluson i/e, CC200, Polish	H48691NE
Advanced Reference Manual Voluson i / Voluson e, CC200, English	H48691ND
Advanced Acoustic Output Manual, Voluson i / Voluson e, CC200, English	KTI303374
eDOC DVD Voluson i/e, CC200	KTI303538

Section 9-11
Probes

9-11-1 2D-Probes


701
702
703
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705
706
707
708

Figure 9-22 2D Transducers

NOTE: The illustrations may not correspond to the actual product!

Table 9-29 2D Transducers

Item	Part Name	Part Number	Description	Qty	CRU	FRU
701	4C-RS	5131629 (H4000SR)	electronic broadband curved array transducer, frequency range of 2-5 MHz Applications: Abdominal, Obstetrics, Gynecology, Pediatric	-	Y	1
702	8C-RS	5434194 (H40402LS) ⇨ **BT Version:**	broadband curved array transducer, 4.0-9.0 MHz, 192 Elements,field of view: max. 175° Applications: Abdominal, Small Parts, Pediatric This probe is only applicable at systems with Software CC200 BT’14.	-	Y	1
703	E8C-RS	2290777 (H40402LN)	electronic endocavity broadband curved array transducer, frequency range of 4-10 MHz and a field-of-view of max. 150° Applications: Obstetrics, Gynecology, Urology	-	Y	1
704	12L-RS	5154514 (H40402LY)	electronic broadband linear array transducer, frequency range of 4-12 MHz, electronically steerable Applications: Small Parts, Peripheral Vascular, Pediatrics, Orthopedics	-	Y	1
705	9L-RS*	KTZ157092 (H40442LL) ⇨ **BT Version:**	broadband linear array transducer, 9L-RS Linear 2D Small parts This probe is only applicable at systems with **BT´09** software.	-	Y	1
706	AB2-7RS	KTZ300275 (H48661NH) ⇨ **BT Version:**	electronic broadband curved array transducer, AB2-7RS Curved 2D Abd. OB/Gyn This probe is only applicable at systems with **BT´09** software.	-	Y	1
707	SP10-16RS*	KTZ300287 (H48661NJ) ⇨ **BT Version:**	broadband linear array transducer, SP10-16RS Linear 2D 10-16MHz This probe is only applicable at systems with **BT´09** software.	-	Y	1
708	IC5-9W-RS	H44901AC 47237169	endocavity broadband curved array transducer Applications: Obstetrics, Gynecology, Urology IC5-9W-RS	-	Y	1

⚠ **NOTICE** The probes 9L-RS and SP10-16RS are not applicable on **Voluson e** (marked with * in this manual).

9-11-2 Real-Time 4D Volume Probes

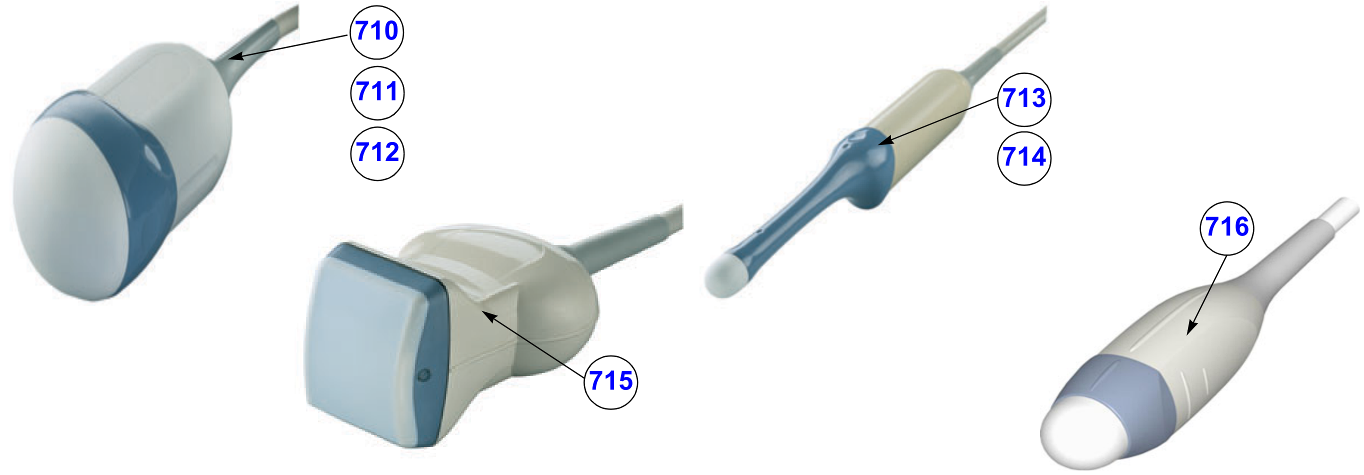


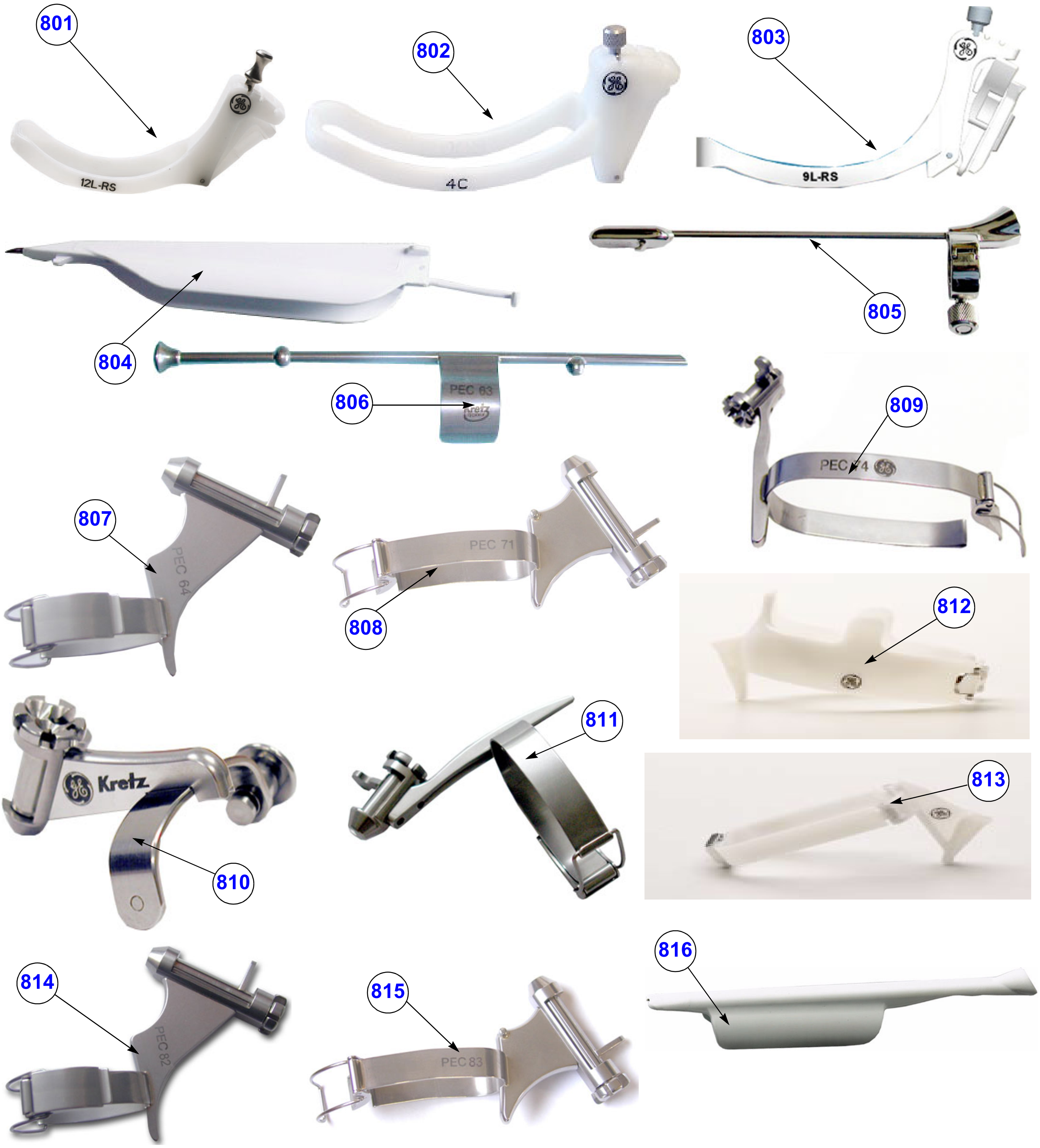
Figure 9-23 Real-Time 4D Volume Probes

Table 9-30 Real-Time 4D Volume Probes

Item	Part Name	Part Number	Description	Qty	CRU	FRU
710	RAB2-5RS	KTZ157007 (H46701NA)	Real-time 4D broadband electronic curved-array transducer with a frequency range of 2-5MHz. Applications: Abdominal, Obstetrics, Gynecology, Interventional Radiology	-	Y	1
711	RAB2-6-RS	KTZ302893 (H48681WR) ➡ **BT Version**	Real-time 4D broadband electronic curved-array transducer with a frequency range of 2-6MHz. Applications: Abdominal, Obstetrics, Gynecology, Interventional Radiology This probe is only applicable at systems with Software CC200 BT'14.	-	Y	1
712	RAB4-8RS	KTZ157074 (H45021L) ➡ **BT Version**	Real-time 4D broadband electronic curved-array transducer with a frequency range of 4-8MHz. Applications: Abdominal, OB, Gyn, Pediatrics, Interventional Radiology Probe is only applicable at systems with **BT´07** software and higher.	-	Y	1
713	RIC5-9RS	KTZ157006 (H46701RA)	Real-time 4D endocavity broadband electronic curved array transducer with a frequency range of 5-9MHz. Applications: Gynecology/Fertility, Obstetrics, Urology **Note:** This probe is only applicable if the option "RIC Probe " is enabled.	-	Y	1
714	RIC5-9W-RS	KTZ157095 (H48661EF)	Real-time 4D endocavity broadband electronic curved array transducer with a frequency range of 5-9MHz. Applications: Gynecology/Fertility, Obstetrics, Urology **Note:** This probe is only applicable if the option "RIC Probe " is enabled.	-	Y	1
715	RSP6-16RS*	KTZ157010 (H46701AC)	Real-time 4D broadband electronic linear array transducer with a frequency range of 6-16 MHz and a scan width of 40 mm. Applications: Small Parts, Periph.Vascular, Pediatrics, Urology, Orthopedics	-	Y	1
716	RNA5-9RS*	KTZ157075 H45021LA ➡ **BT Version**	Real-time 4D neonatal broadband electronic curved array transducer with a frequency range of 5-9MHz. Applications: Obstetrics, Pediatrics/Neonatology, Cardiology, Small Parts Probe is only applicable at systems with **BT´07** software and higher.	-	Y	1

⚠ **NOTICE** The probes RNA5-9RS and RSP6-16RS aren't applicable on **Voluson e** (marked with ***** in the manual).

Section 9-12
Biopsy Needle Guides


801
802
803
12L-RS
4C
9L-RS
805
804
806
PEC 63
Kretz
809
PEC 74
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PEC 64
PEC 71
808
812
811
Kretz
813
810
816
814
PEC 82
815
PEC 83

Figure 9-24 Biopsy Needle Guides

NOTE: The illustrations may not correspond to the actual product!

Table 9-31 Biopsy Needle Guides

Item	Part Name	Part Number	Description	Qty	CRU	FRU
801	12L-RS Multi-angle bracket	H40432LC	Non Sterile Multi Angle Bracket needle guide for probe 11L/12L-RS needle diameter: > 0.6 mm - < 2.1 mm	-	N	N
802	**** (non sterile)	E8385NA	Non Sterile 4C General Purpose Multi Angle Bracket needle diameter: > 0.6 mm - < 2.1 mm	-	N	N
803	9L-RS Multi-angle bracket	H4906BK	Non Sterile Multi Angle Bracket needle guide for probe 9L-RS needle diameter: > 0.6 mm - < 2.1 mm	-	N	N
804	**** (disposable)	E8385MJ	disposable Biopsy needle guide for probe E8C-RS (20 pcs.) needle diameter: < 1.8 mm	-	N	N
805	**** (reusable)	H40412LN	reusable Biopsy needle guide for probe E8C-RS needle diameter: < 1.65 mm	-	N	N
806	PEC63	H46721R KTZ220003	reusable Biopsy needle guide for probe RIC5-9RS needle diameter: < 1.8 mm	-	N	1
807	PEC64	H46721B	reusable Biopsy needle guide for probe SP10-16RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	1
808	PEC71	H46721D	reusable Biopsy needle guide for probe AB2-7RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	1
809	PEC74	H48621Y KTZ220078	reusable Biopsy needle guide for probe RAB2-5RS, RAB2-6RS and RAB4-8RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	1
810	PEC75	H46721W KTZ196275	reusable Biopsy needle guide for probe RSP6-16RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	1
811	PEC76	H48651DG KTZ220119	reusable Biopsy needle guide for probe RNA5-9RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	N
812	RAB Guide PEC78	H46701AE	non-sterile RAB2-5RS, RAB2-6RS and RAB4-8RS single-angle bracket (6.5 cm), Ultra-Pro II needle guide with 14 x 91.5 cm (5.5”x36”) telescopically-folded CIV-Flex™ cover (3D) (5)	-	N	N
813	RSP Guide	H46701AD	non-sterile RSP5-12, RSP6-12, RSP6-16 single-angle bracket (2 cm), Ultra-Pro II needle guide with 14 x 91.5 cm (5.5”x36”) telescopically-folded CIV-Flex™ cover (3D) (5)	-	N	N
814	PEC82	H48671MD	reusable Biopsy needle guide for probe SP10-16RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	N
815	PEC83	H48671ME	reusable Biopsy needle guide for probe AB2-7RS needle diameter: < 1 mm, 1.4 mm, 2.2 mm	-	N	N
816	RIC Single-angle bracket	H48681GF	disposable Biopsy needle guide for probe RIC5-9W-RS needle diameter: 1.2 - 1.6 mm	-	N	N

⚠ **NOTICE** A sales order has to be obtained for most of the Biopsy Needle Guides.

Chapter 10
Care & Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

It has been determined by GE that your Voluson i / Voluson e system does not have any high wear components, therefore no Periodic Maintenance Inspections are mandatory.
However, to maintain the safety and performance of the ultrasound system, a regular check by authorized personnel remains recommended.

10-1-2 Purpose of Chapter 10

This chapter describes **Care & Maintenance** on the ultrasound system and its peripherals.
These procedures are intended to **maintain the quality** of the ultrasound **systems performance**.
Read this chapter completely and familiarize yourself with the procedures before performing a task.

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why do Maintenance	10-2
10-3	Maintenance Task Schedule	10-2
10-4	Tools Required	10-5
10-5	System Maintenance	10-6
10-6	Using a Phantom	10-11
10-7	Electrical Safety Tests	10-12
10-8	When There's Too Much Leakage Current...	10-24
10-9	Ultrasound Equipment Quality Check (EQC)	10-25

⚠ CAUTION **Practice good ESD prevention. Wear an anti–static strap when handling electronic parts and even when disconnecting/connecting cables.**

⚠ WARNING ***THERE ARE SEVERAL PLACES ON THE BACKPLANE, THE AC DISTRIBUTION AND DC DISTRIBUTION THAT ARE DANGEROUS. BE SURE TO DISCONNECT THE SYSTEM POWER PLUG AND REMOVE THE BATTERY, BEFORE YOU REMOVE ANY PARTS. BE CAUTIOUS WHENEVER POWER IS STILL ON AND COVERS ARE REMOVED.***

⚠ CAUTION **Do not operate this unit unless all board covers and frame panels are securely in place. System performance and cooling require this.**

⚠ CAUTION **Do not pull out or insert circuit boards while power is ON.**

Section 10-2
Why do Maintenance

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Ultrasound Equipment Quality Check form provides the customer with documentation that the ultrasound scanner is maintained on a periodic basis.

A copy of the Ultrasound Equipment Quality Check (EQC) form (see: page 10 - 25) should be kept in the same room or near the scanner.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the American College of Radiology (USA), it is the customer's responsibility to have a quality assurance program in place for each scanner. The program must be directed by a medical physicists, the supervising radiologist/physician or appropriate designer.

Routine quality control testing must occur regularly. The same tests are performed during each period so that changes can be monitored over time and effective corrective action can be taken.

Testing results, corrective action and the effects of corrective action must be documented and maintained on the site.

Your GE service representative can help you with establishing, performing and maintaining records for a quality assurance program. Please contact us for coverage information and/or price for service.

Section 10-3
Maintenance Task Schedule

10-3-1 How often should care & maintenance tasks be performed?

The Customer Care Schedule (see: page 10-3) specifies how often your Voluson i / Voluson e should be serviced and outlines items requiring special attention.

NOTE: *It is the customer's responsibility to ensure the Voluson i / Voluson e care & maintenance is performed as scheduled in order to retain its high level of safety, dependability and performance.*

Your GE Service Representative has an in-depth knowlegde of your Voluson i / Voluson e ultrasound scanning system and can best provide competent, efficient service.
Please contact us for coverage information and/or price for service.

The service procedures and recommended intervals shown in the Customer Care Schedule assumes that you use your Voluson i / Voluson e for an average patient load (10-12 per day) and not use it as a primary mobile unit which is transported between diagnostic facilities.

NOTE: *If conditions exist which exceed typical usage and patient load, then it is recommended to increase the maintenance frequencies.*

Abbreviations used in the Customer Care Schedule Table 10-2:

D = Daily W = Weekly M = Monthly A = Annually

10-3-1 How often should care & maintenance tasks be performed? (cont'd)

Table 10-2 Customer Care Schedule

Item	Service at Indicated Time	D	W	M	A	Notes
AC Main Cable	Inspect AC Main Cable			●		Mobile Unit Check weekly
Cables and Connectors	Check if all cables are fixed well seated at the correct position and if there is no mechanical damage visible.				●	also after corrective maintenance
Mechanical parts	Clean and inspect the mechanical function of wheels, casters, brakes and swivel locks as well as side door, foot rest, front and rear handle, and monitor holder (when using a Cart). Remove Dust and Coupling gel.			●		Mobile Unit Check Daily
Control Console movement	Check Translation/Rotation and Hight Adjustment (Elevation)(wehen using a Cart)				●	more frequently at Mobile Units
Trackball Check	Check proper operation (Cursor movement X, Y direction)	●				If failure occurs go to trackball cleaning.
Trackball Cleaning	Remove trackball ring; open the trackball housing and take out the trackball (refer to Section 7-8-3 on page 7-22). Clean the trackball with soft tissue and screwdriver shaft.				●	
Disk Drives (Sonoview Data Backup)	Test Image filing (Sonoview) Import and Export data capability (DVD/CD Drive)		●	●*		* save the image filing data weekly or at least monthly on DVD/CD depending on the number of examinations
Safe Probe Operation	Clean probes and probe cables and check acoustic lens housing (cracks) and probe cables. In case of mechanical damage, don't use them! **Danger:** Safety risk for operator and patient.	●*				* or before each use
Probe Air bubbles	To detect air bubbles in filling liquid, shake the probe carefully and check abnormal noise.					
Probe connectors	Remove dust/dirt of all probe connectors. Clean with vacuum cleaner if dust is visible.			●		
Console Leakage Current Checks					●	Also after corrective maintenance or as required by your facilities QA program.
Peripheral Leakage Current Checks					●	Also after corrective maintenance or as required by your facilities QA program.
Surface Probe Leakage Current Checks					●	Also after corrective maintenance or as required by your facilities QA program.
Endocavity Probe Leakage Current Checks					●	Also after corrective maintenance or as required by your facilities QA program.
Measurement Accuracy Checks					●	Also after corrective maintenance or as required by your facilities QA program.

Table 10-2 Customer Care Schedule

Item	Service at Indicated Time	D	W	M	A	Notes
Probe/Phantom Checks	Check axial and lateral resolution (see Basic User Manual Technical specifications). Check Gain and TGC changes, vary the focus and check reaction on screen. *NOTE! The use of a Phantom is not required during Preventive Maintenance. Customer may use it as part of their Quality Assurance Program tests*.				●	Also after corrective maintenance or as required by your facilities QA program.
Functional Checks of all probes Section 10-5-2 on page 10-6	*NOTE! The use of a Phantom is not required during Preventive Maintenance. Customer may use it as part of their Quality Assurance Program tests.*				●	Also after corrective maintenance or as required by your facilities QA program.

Section 10-4
Tools Required

10-4-1 Special Tools, Supplies and Equipment used for Maintenance

Table 10-3 Overview of Requirements for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		minimum 5% accuracy, 3.5 digit and 200 Ohm range required
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes anti–static mat, wrist strap and cables for 200 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS *NOTE! The use of a Phantom is not required during Preventive Maintenance. Customer may use it as part of their Quality Assurance Program tests.*
CD-RW Media		(minimum quad speed)
DVD+RW Disc Media blank		blank 4,7GB DVD+RW disc
B/W Printer Cleaning Sheet		see printer user manual for requirements
Color Printer Cleaning Sheet		see printer user manual for requirements
Disposable Gloves		

Section 10-5
System Maintenance

10-5-1 Preliminary Checks

The preliminary checks take ~15 minutes to perform. Refer to the system user documentation.

Table 10-4 System Preliminary Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the top of the EQC (Ultrasound Equipment Quality Check) form (see: page 10-25). Note all probes and system options.
3	Power up	Turn the system power on and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the LCD monitor.
6	Presets	“Full Backup” all customer presets on Hard disk and/or DVD (see: Section 4-5-3 "Save Full Backup (Presets, Configurations & Application Settings)" on page 4-32).

10-5-2 Functional Checks

The functional checks take about 60 minutes to perform.
Refer to the Voluson i / Voluson e Basic User Manual whenever necessary.

10-5-2-1 System Checks

Table 10-5 System Functional Checks

Step	Item	Description
1	B Mode	Verify basic B Mode (2D) operation. Check the basic system controls that affect this mode of operation.
2	M Mode	Verify basic M Mode operation. Check the basic system controls that affect this mode of operation.
3	CFM Mode	Verify basic CFM Mode (Color Flow Mode) and PD Mode (Power Doppler Mode) operation. Check the basic system controls that affect this mode of operation.
4	Spectral Doppler Mode	Verify basic PW Doppler Mode operation. Check the basic system controls that affect this mode of operation.
5	3D Mode (optional)	Verify basic 3D Mode operation. Check the basic system controls that affect this mode of operation.
6	RealTime 4D Mode (optional)	Verify basic RealTime 4D Mode operation. Check the basic system controls that affect this mode of operation.
7	*Applicable Software Options	Verify the basic operation of all optional modes such as Contrast. Check the basic system controls that affect each options operation.
8	Keyboard Test	Perform the Keyboard Test Procedure to verify that all keyboard controls are OK.
9	LCD Display	Verify basic LCD display functions.
10	Measurements	If available, scan a gray scale phantom and use the measurement controls to verify distance and area calculation accuracy. *NOTE! The use of a Phantom is not required during Preventive Maintenance.* *Customer may use it as part of their Quality Assurance Program tests.* Refer to the Basic User Manual, for measurement accuracy specifications.

*NOTE: * Some software may be considered standard depending upon system configuration.*

10-5-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to Table 3-13, “Approved Peripherals,” on page 3-103 for a list of approved peripherals.

Table 10-6 Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
2	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
3	Color Deskjet (Bluetooth) Printer	Verify hardcopy output of the Deskjet (Bluetooth) printer. Clean heads and covers if necessary.
4	VCR	Verify record/playback capabilities of the VCR. Clean heads and covers if necessary.
5	DVD Recorder	Verify record/playback capabilities of the DVD recorder. Clean heads and covers if necessary.
6	DICOM®	Verify that DICOM® is functioning properly. Send an image to a DICOM® device.
7	DVD-Drive	Verify that the DVD-drive reads/writes properly (export/recall images in Sonoview).

10-5-2-3 Mains Cable Inspection

Table 10-7 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the main cable from the wall and system.
2	Inspect	Inspect it and its connectors for damage of any kind.
3	Verify	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Verify	Inlet connector retainer is functional.

10-5-2-4 Optional Diagnostic Checks

Optionally you can access the diagnostic software as described in Chapter 5 or 7.
View the error logs and run desired diagnostics.

10-5-3 Physical Inspection

Table 10-8 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition.
2	Scratches and Dents	Inspect the system for dents, scratches or cracks.
3	LCD Display Cover	Verify ease of *up*/*down* movement and make sure that the LCD Display cover holds its set position when open and that there is no play on the mechanism. Check that the cover latches *open* and *lock* correctly.
4	LCD Display	Inspect the LCD Display for scratches and raster burns.
5	Control Panel and Keyboard	Inspect the Control Panel and Keyboard. Note any damaged or missing items. (Replace faulty components, as required). Verify proper operation of Control Panel backlighting and TGC sliders.
6	Modo Cart	Check all four Modo Cart wheels and castors for wear. Check the brakes on each of the two front wheels. Make sure that pressing the brake locks the wheel, preventing it from swivelling or rolling and therefore stopping movement of the Modo Cart. Verify that releasing the brakes allows free movement of the Modo Cart.
7	Dock Cart	Check all four Dock Cart wheels and castors for wear. Check the brakes on each of the two front wheels. Make sure that pressing the brake locks the wheel, preventing it from swivelling or rolling and therefore stopping movement of the Dock Cart. Verify that releasing the brakes allows free movement of the Dock Cart.
8	Voluson Station	Check all four Voluson Station wheels and castors for wear. Check the brakes on each of the two front wheels. Make sure that pressing the brake locks the wheel, preventing it from swivelling or rolling and therefore stopping movement of the Voluson Station. Verify that releasing the brakes allows free movement of the Voluson Station.
9	DVD+R/RW Drive	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. DVDs/CDs must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the drive.
10	Cables and Connectors	Check all internal cable harnesses and connectors for wear, and secure connector seating. Pay special attention to probe strain or bend reliefs.
11	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation or other deterioration, and verify continuity. Tighten the clamps that secure the power cord to the unit and the outlet plug to the cord. Replace the power cord and clamp, as required.
12	Shielding and Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems during scanning.
13	Peripherals	Check and clean the peripherals according to the manufacturer’s directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
14	External I/O	Check all connectors for damage and verify that the labeling is good.
15	Power and System Status Indicators	Check for proper operation of all Power and System Status Indicators.
16	Microphone	Check for proper operation of microphone by recording an Audio Test.
17	Battery	Check that the battery is not damaged, does not leak, does not emit an odor, and is not deformed or discolored.

10-5-4 Cleaning

10-5-4-1 General Cleaning

Frequent and diligent cleaning of the Voluson i / Voluson e ultrasound system reduces the risk of spreading infection from person to person, and also helps to maintain a clean working environment.

NOTE: Refer to the Basic user manual of Voluson i / Voluson e for details on cleaning and desinfection.

10-5-5 Probe Maintenance

10-5-5-1 Probe Related Checks

Table 10-9 Probe Related Checks

Step	Item	Description
1	Probes	Thoroughly check the system probe connectors and remove dust from inside the connector sockets if necessary. Visually check for bent, damaged or missing pins. Verify that the system properly recognizes all probes.
2	Probe Holder	Clean probe holders on Cart (they may need to be soaked to remove excess gel).

10-5-5-2 Basic Probe Care

The Basic User Manual and/or care card provides a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

Ultrasound probes can be easily damaged by improper handling. Review the Basic User Manual of Voluson i / Voluson e for more details. Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

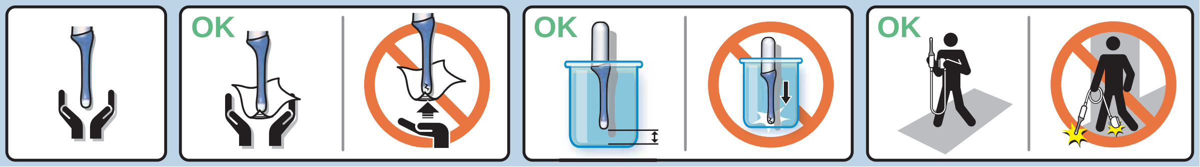


Figure 10-1 Care Card

Any evidence of wear indicates the probe cannot be used.

Do a visual check of the probe pins and system sockets before plugging in a probe.

10-5-5-3 Basic Probe Cleaning and/or Disinfection

Refer to the Basic User Manual of Voluson i / Voluson e for details on cleaning and desinfection.

WARNING ***To help protect yourself from blood borne diseases, wear approved disposable gloves. These are made of nitrile derived from vegetable starch to prevent allergic latex reactions.***

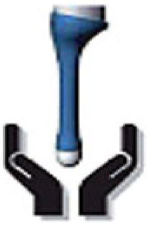
CAUTION **Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty.**
DO NOT soak or wipe the lens with any product not listed in the Voluson i / Voluson e Basic User Manual and/or care card (supplied with the probe). Doing so could result in irreparable damage to the probe and/or Voluson i / Voluson e system.

CAUTION **Follow the Care Card instructions supplied with each probe (inside the transducer boxes) for disinfectants and gels that are compatible with the surface material of the probes.**

NOTICE For the latest list of compatible cleaning solutions and disinfectants refer to:
http://www.gehealthcare.com/usen/ultrasound/products/probe_care.html

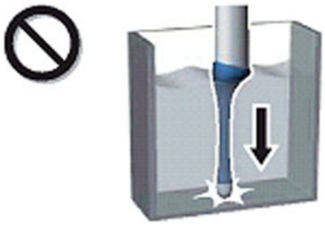
CAUTION **Disinfect a defective probe before you return it. Be sure to tag the probe as being disinfected.**

CAUTION

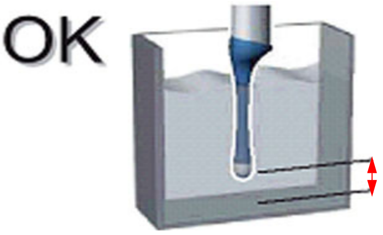


Please be aware of the sensitive probe head.

TAKE EXTREME CARE!



NEVER place or store a probe on its scan head!



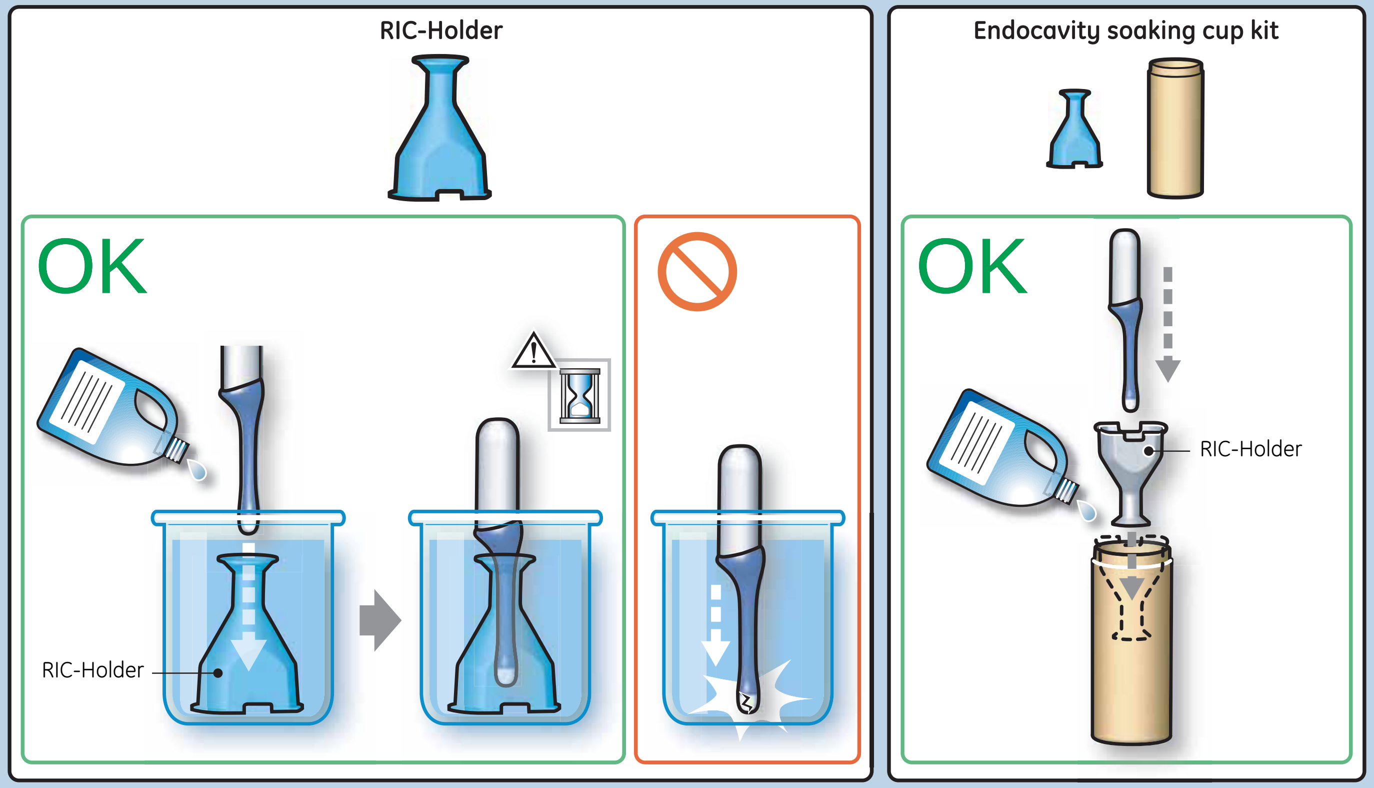
When disinfecting a probe, ensure that there is sufficient space between the probe and the container bottom!

10-5-5-4 Disinfection by means of the RIC-Holder

Especially for Real-time 4D endocavity probes (RIC), it is necessary to take extreme care when transporting the system with the probe attached, or during the disinfection process.
Inadequate handling may lead to dead elements, shocked head mechanics, etc.

The RIC-Holder (especially developed for RIC Real-time 4D endocavity probes) guarantees that the sensitive probe head does not hit the bottom of the container during the disinfection procedure.

NOTE: Instructions are supplied with each RIC-Holder (KTZ225469).



Section 10-6
Using a Phantom

The use of a Phantom is not required during Preventive Maintenance.
Customer may use it as part of their Quality Assurance Program tests.

Section 10-7
Electrical Safety Tests

10-7-1 Safety Test Overview

The electrical safety tests in this section are based on IEC60601 standartd including national deviatons for Health Care Facilities and IEC 62353 Medical electrical equipment – Recurrent test and test after repair of medical electrical equipment. These standards provide guidance on evaluating electrical safety of medical devices which are placed into service and are intended for use in planned maintenance (PM) or testing following service or repair activities. They differ somewhat from the standards that are used for design verification and manufacturing tests (e.g., IEC 60601-1 including national deviations) which require a controlled test environment and can place unnecessary stress on the system.

Prior to initiating any electrical test, the system must be visually inspected. Perform the following visual checks:

- Check for missing or loose enclosure covers that could allow access to internal live parts.
- Examine the mains cord, mains plug and appliance inlet for damaged insulation and adequacy of strain relief and cable clamps.
- Locate and examine all associated transducers. Inspect the cables and strain relief at each end. Inspect the transducer enclosure and lens for cracks, holes and similar defects.

⚠ CAUTION **Compare all safety-test results with safety-test results of previously performed safety tests (e.g., last year etc.). In case of unexplainable abrupt changes of safety-test results consult experienced authorized service personnel or GE for further analysis.**

⚠ WARNING ***Equipment users must ensure that safety inspections are performed whenever damage is suspected and at least every 12 months in accordance with local authorities and facility procedures.***
DO NOT use the system or individual probes which fail any portion of the safety test.

⚠ WARNING ***TO MINIMIZE RISK OF ELECTRIC SHOCK, ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE ELECTRICAL SAFETY INSPECTIONS AND TESTS.***

⚠ CAUTION **To avoid electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The unit under test must not be contacted by users or patients while performing these tests.**

⚠ CAUTION **Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.**

⚠ CAUTION **For all instructions in Section 10-7:**
In case of using an UPS (uninterruptable power supply) the terms outlet, wall outlet, AC wall outlet or power outlet refer to the AC wall outlet to which the UPS power input is connected to. In case of further available AC (or DC) power outlets at the same used UPS these must remain unused; i.e. not connected to any other devices.

10-7-2 Leakage Current Limits

The following acceptance limits and test conditions are summarized from IEC60601 including national deviations and IEC 62353 and in some cases are lower than that specified by the standards. In accordance with these standards, fault conditions like Reverse Polarity of the supply mains and Open Neutral are no longer required for field evaluation of leakage current. Because the main source of leakage current is the mains supply, there are different acceptance limits depending on the configuration of the mains (100-120VAC or 230-240VAC).

Table 10-10 Leakage Current Limits for Operation on 100-120 Volt Mains (US/Canada/Japan)

Leakage Current Test	System Power	Grounding/PE Conductor	Limit mA
Chassis/Enclosure Leakage	On and Off	Open	0.3
Type BF Applied Parts	On (transmit)	Closed Open	0.1 0.5
Type CF Applied Parts	On (transmit)	Closed Open	0.01 0.05
Type CF Applied Parts (sink leakage)	On and Off	Closed	0.05

Table 10-11 Leakage Current Limits for System Operation on 230-240 Volt Mains

Leakage Current Test	System Power	Grounding/PE Conductor	Limit mA
Chassis/Enclosure Leakage	On	Open and Closed	0.5
Type BF Applied Parts	On (transmit)	Open	0.5
Type CF Applied Parts	On (transmit)	Open	0.05
Type CF Applied Parts (sink leakage)	On and Off	Closed	0.05

Table 10-12 ISO (on Dale 600) and Mains Applied (on Dale 601) Limits*

Probe Type	Measurement
BF	5 mA
CF	0.05 mA

* **ISO** (on Dale 600) and **Mains Applied** (on Dale 601) refer to the sink leakage test where mains (supply) voltage is applied to the part to determine the amount of current that will pass (or sink) to ground if a patient contacted mains voltage.

Table 10-13 Equipment Type and Test Definitions

Applied Parts (AP)	Parts or accessories that contact the patient to perform their function. For ultrasound equipment, this includes transducers and ECG leads.	
Type BF	Body Floating or non-conductive ultrasound probes which are marked with the 'man in box' BF symbol. This includes all transducers.	🯅
Type CF	Cardiac Floating or non-conductive intraoperative probes for direct cardiac contact and isolated ECG connections so marked with the 'heart in box' CF symbol.	♥
Sink Leakage	The current resulting from the application of mains voltage to the applied part. This test is required test for Type CF applied parts.	

10-7-3 Outlet Test - Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

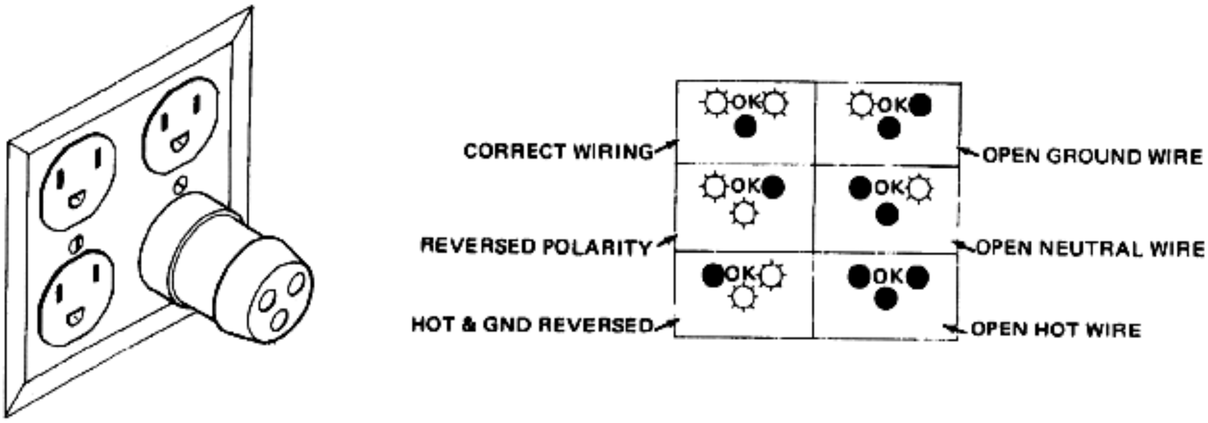

CORRECT WIRING
REVERSED POLARITY
HOT & GND REVERSED
OPEN GROUND WIRE
OPEN NEUTRAL WIRE
OPEN HOT WIRE
OK
OK
OK
OK
OK
OK

Figure 10-2 Typical Alternate Outlet Tester

NOTE: *No outlet tester can detect the condition where the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.*

10-7-4 Grounding Continuity (Systems with Modo Cart only)

CAUTION **Electric Shock Hazard!**
The patient or operator MUST NOT come into contact with equipment during this test.

NOTE: This test is not valid for stand-alone Voluson i / Voluson e systems and is only applicable when the Voluson i / Voluson e portable ultrasound system is mounted on the Modo Cart.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the Modo Cart.
The ground wire resistance should be less than **0.2** ohms.
Reference the procedure in the IEC 60601-1-1.

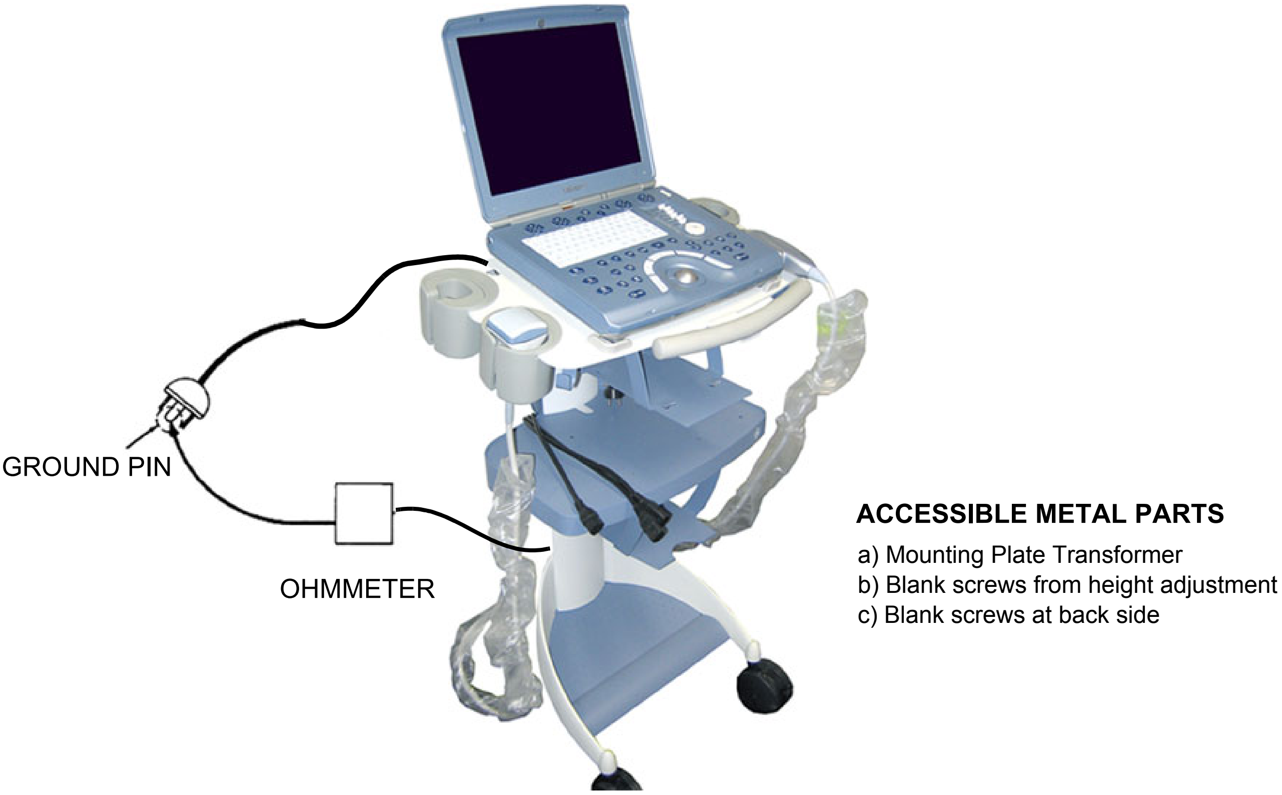

GROUND PIN
OHMMETER
ACCESSIBLE METAL PARTS
a) Mounting Plate Transformer
b) Blank screws from height adjustment
c) Blank screws at back side

Figure 10-3 Ground Continuity Test

CAUTION **Lacquer is an isolation barrier! Resistor may be high-impedance!**
Measure only on blank parts, stated in Figure 10-3, above.

10-7-4-1 Meter Procedure

Follow these steps to test the Ground wire resistance.

1.) Turn the Voluson i / Voluson e unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the Voluson i / Voluson e unit.
4.) Set the meter’s “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the Ground wire resistance.

10-7-5 Grounding Continuity (Systems with Dock Cart only)

CAUTION **Electric Shock Hazard!**
The patient or operator MUST NOT come into contact with equipment during this test.

NOTE: *This test is not valid for stand-alone Voluson i / Voluson e systems and is only applicable when the Voluson i / Voluson e portable ultrasound system is mounted on the Dock Cart.*

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the Dock Cart.
The ground wire resistance should be less than **0.2** ohms.
Reference the procedure in the IEC 60601-1-1.

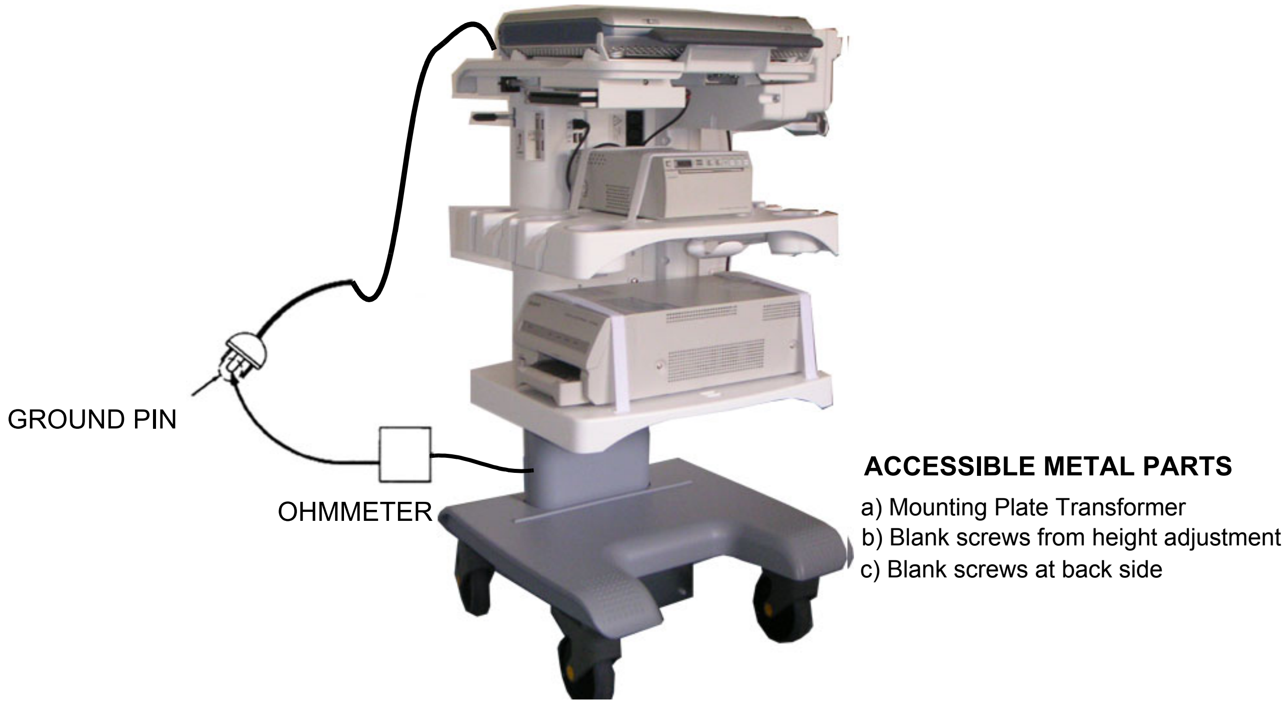

GROUND PIN
OHMMETER
ACCESSIBLE METAL PARTS
a) Mounting Plate Transformer
b) Blank screws from height adjustment
c) Blank screws at back side

Figure 10-4 Ground Continuity Test

CAUTION **Lacquer is an isolation barrier! Resistor may be high-impedance!**
Measure only on blank parts, stated in Figure 10-4, above.

10-7-5-1 Meter Procedure

Follow these steps to test the ground wire resistance.

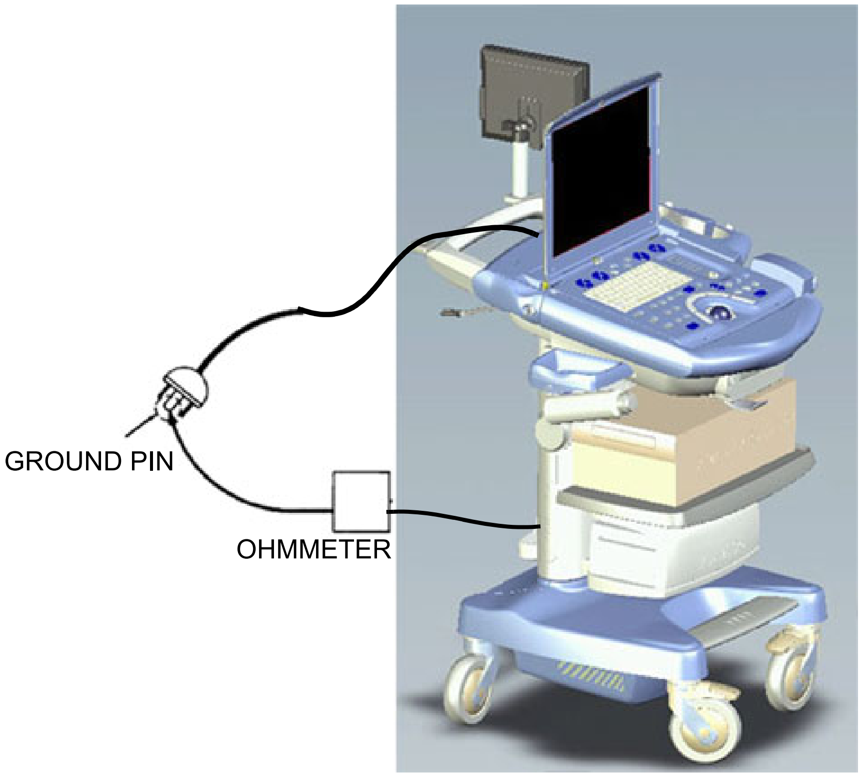
1.) Turn the Voluson i / Voluson e unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the Voluson i / Voluson e unit.
4.) Set the meter’s “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the Ground wire resistance.

10-7-6 Grounding Continuity (Systems with Voluson Station only)

CAUTION **Electric Shock Hazard!**
The patient or operator MUST NOT come into contact with equipment during this test.

NOTE: This test is not valid for stand-alone Voluson i / Voluson e systems and is only applicable when the Voluson i / Voluson e portable ultrasound system is mounted on the Voluson Station.

Measure the resistance from the third pin of the attachment plug to the exposed metal parts of the Voluson Station.
The ground wire resistance should be less than **0.2** ohms.
Reference the procedure in the IEC 60601-1-1.



ACCESSIBLE METAL PARTS

a) Mounting Plate Transformer
b) Blank screws from height adjustment
c) Blank screws at back side

Figure 10-5 Ground Continuity Test

CAUTION **Lacquer is an isolation barrier! Resistor may be high-impedance!**
Measure only on blank parts, stated in Figure 10-5, above.

10-7-6-1 Meter Procedure

Follow these steps to test the ground wire resistance.

1.) Turn the Voluson i / Voluson e unit OFF.
2.) Plug the unit into the meter, and the meter into the tested AC wall outlet.
3.) Plug the black chassis cable into the meter's “CHASSIS” connector and attach the black chassis cable clamp to an exposed metal part of the Voluson i / Voluson e unit.
4.) Set the meter’s “FUNCTION” switch to the RESISTANCE position.
5.) Set the meter's “POLARITY” switch to the OFF (center) position.
6.) Measure and record the Ground wire resistance.

10-7-7 Chassis Leakage Current Test

DANGER **Electric Shock Hazard.**

When the meter's ground switch is OPEN, DO NOT touch the unit!

CAUTION **Equipment damage possibility. Never switch the Polarity and the status of Neutral when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the POLARITY switch and/or the NEUTRAL switch. Otherwise, the unit may be damaged.**

10-7-7-1 Definition

This test measures the current that would flow through a grounded person who touches the accessible conductive parts of the equipment during normal and fault conditions.
The test verifies the isolation of the power line from the chassis.

The meter is connected to parts of the equipment, easily contacted by the user or patient.
Measurements should be made under the test conditions specified in:

- Table 10-10 on page 10-13, or
- Table 10-11 on page 10-13, as applicable.

Record the highest reading.

10-7-7-2 Generic Procedure

The test verifies the isolation of the power line from the chassis.
The testing meter is connected from accessible metal parts of the case to ground.
Measurements should be made under the test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

Record the highest reading of current.

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test is plugged into the receptacle on the panel of the meter.
This places the meter in the grounding conductor and the current flowing from the case to ground will be indicated in any of the current ranges.

The maximum allowable limit for chassis source leakage is shown in:

- Table 10-10 on page 10-13, or
- Table 10-11 on page 10-13, as Chassis/Enclosure Leakage.

10-7-7-3 Data Sheet for Enclosure/Chassis Leakage Current

Table 10-14 shows a typical format for recording the enclosure/chassis leakage current. Measurements should be recorded from multiple locations for each set of test conditions.

The actual location of the test probe may vary by system.
Record all data in the Electrical safety tests log.

Table 10-14 Typical Data Format for Recording Chassis Source Leakage

Unit Under Test: ____________________________ **Date of Test:** ________________________

Test Conditions		Measurement/Test Point Location			
System Power	**Grounding/PE**	***Potential equilibrium connector***	***Monitor housing***	***Probe connector***	
off	closed				
off	open				
on	closed				
on	open				

10-7-8 Isolated Patient Lead (Source) Leakage–Lead to Ground

CAUTION **Equipment damage possibility. Never switch the Polarity when the unit is powered ON. Be sure to turn the unit power OFF before switching the polarity using the POLARITY switch. Otherwise, the unit may be damaged.**

10-7-8-1 Definition

This test measures the current which would flow to ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface.

Measurements should be made under the test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

10-7-8-2 Generic Procedure

Measurements should be made under the test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

For each combination, the operating controls such as the lead switch should be operated to find the worst case condition.

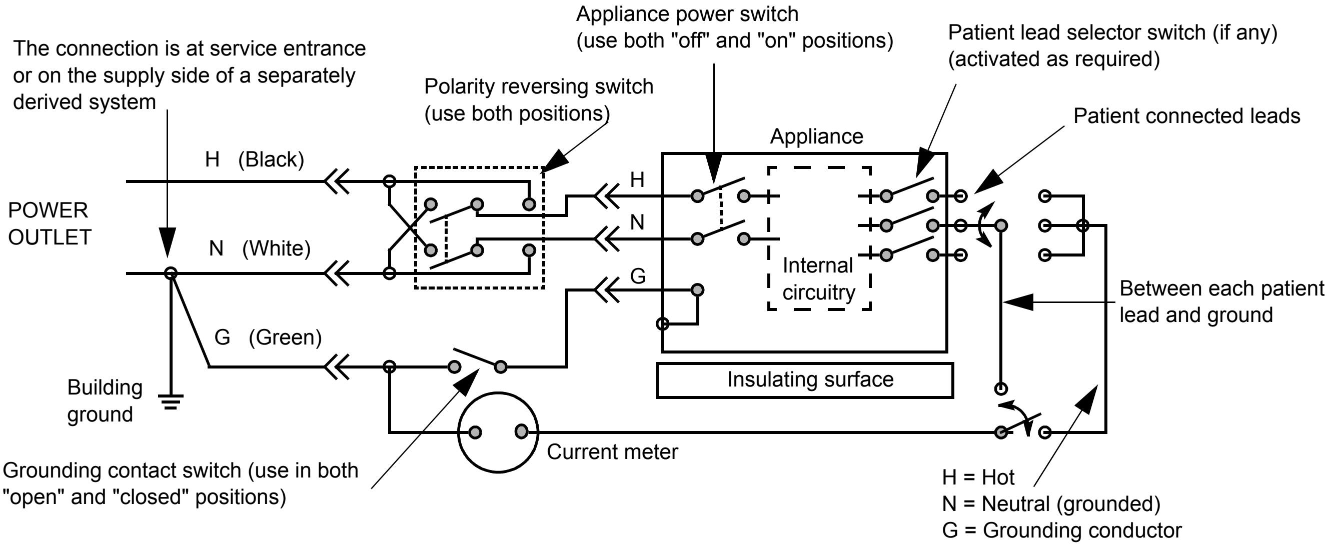

The connection is at service entrance or on the supply side of a separately derived system
Appliance power switch (use both "off" and "on" positions)
Patient lead selector switch (if any) (activated as required)
Polarity reversing switch (use both positions)
Patient connected leads
Appliance
POWER OUTLET
H (Black)
N (White)
G (Green)
H
N
G
Internal circuitry
Between each patient lead and ground
Insulating surface
Building ground
Current meter
Grounding contact switch (use in both "open" and "closed" positions)
H = Hot
N = Neutral (grounded)
G = Grounding conductor

Figure 10-6 Test Circuit for Measuring Patient Lead Leakage

10-7-9 Isolated Patient Lead (Source) Leakage–Lead to Lead

When using the Dale 600, switch the meter's function selector to the LEAD-LEAD position.

Select and test each of the ECG lead positions (except ALL) on the LEAD selector, testing each to the power and ground condition combinations found in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

Record the highest leakage current measured.

10-7-9-1 Lead to Lead Leakage Test Record

Table 10-15 shows a typical format for recording the patient lead to lead leakage current.

Measurements should be recorded from each lead combination under each set of test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

Record all data on the EQC inspection certificate.

Table 10-15 Typical Data Format for Recording Patient Lead to Lead Leakage

Unit Under Test: ____________________________ **Date of Test:** ________________________

Test Conditions		Patient Lead or Combination Measured		
System Power	**Grounding/PE**	***RA-LA***	***LA-LL***	***LL-RA***
Mains on	*open*			
RF on	*open*			

NOTE: Values in italics font are given as examples only.

10-7-10 Isolated Patient Lead (Sink) Leakage-Isolation Test

⚠ **CAUTION** **Line voltage is applied to the ECG leads during this test. To avoid possible electric shock hazard, the system being tested must not be touched by patients, users or anyone while the ISO TEST switch is depressed.**

1.) When using the Dale 600, switch the meter's function selector to the LEAD-ISO.
2.) Select the ALL position on the lead selector since the test is performed with mains applied to all leads at the same time.
3.) Depress the rocker switch to ISO TEST to test lead isolation.

10-7-10-1 Isolated Lead (sink) Leakage Test Record

Table 10-16 shows a typical format for recording the isolated patient lead sink leakage current.

Measurements should be recorded for the full lead combination under each set of test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

Record all data on the inspection certificate.

Table 10-16 Typical Data Format for Recording Isolated Lead (sink) Leakage

Unit Under Test: ____________________________ **Date of Test:** ________________________

Test Conditions		Patient Lead
System Power	**Grounding/PE**	***RA+LA+LL***
on	*closed*	
off	*closed*	

NOTE: Values in italics font are given as examples only.

10-7-11 Probe Leakage Current Test

DANGER **Do not use the probe if the insulating material has been punctured or otherwise compromised. Integrity of the insulation material and patient safety can be verified by safety testing according to IEC60601-1.**

10-7-11-1 Definition

This test measures the current that would flow to ground from any of the probes through a patient who is being scanned and becomes grounded by touching some other grounded surface.

NOTE: *Some leakage current is expected on each probe, depending on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. It is abnormal if no leakage current is measured.*
If no leakage current is detected, check the configuration of the test equipment.

10-7-11-2 Tools

For needed tools, see: Section 10-4 "Tools Required" on page 10-5

10-7-11-3 Generic Procedure on Probe Leakage Current

The most common method of measuring probe leakage is to partly immerse the probe into a saline bath while the probe is connected to the ultrasound system and active.
This method measures the actual leakage current resulting from the transducer RF drive.

Measurements should be made under the test conditions specified in:

- Table 10-10 on page 10-13, or:
- Table 10-11 on page 10-13, as applicable.

For each combination, the probe must be active to find the worst case condition.

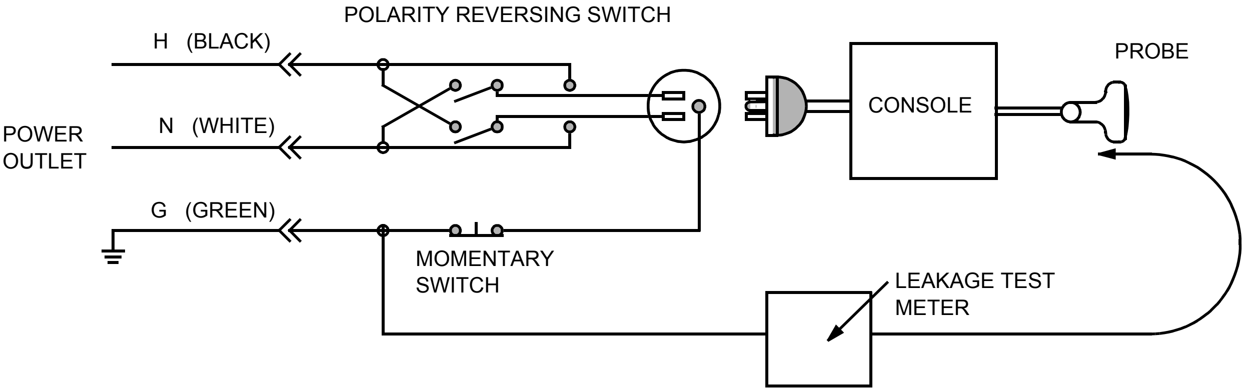


Figure 10-7 Set Up for Probe Leakage Current

NOTE: *Each probe will have some amount of leakage current, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.*

Section 10-8
When There's Too Much Leakage Current...

10-8-1 Chassis Fails

Check the ground on the power cord and plug for continuity. Ensure the ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all grounds. Ensure star washers are under all ground studs.
Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: *No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high leakage currents, this should be suspected as a possible cause and the outlet wiring should be visually inspected.*

10-8-2 Probe Fails

- Test another probe to isolate if the fault lies with the probe or the scanner.

NOTE: *Each probe will have some amount of leakage, dependent on its design. Small variations in probe leakage currents are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable leakage current for body surface contact probe differs from inter-cavity probe. Be sure to enter the correct probe type in the appropriate space on the check list.*

- Test the probe in another connector to isolate if the fault lies with the probe or the scanner.

  If excessive leakage current is slot dependent, inspect the system connector for bent pins, poor connections, and ground continuity.

  If the problem remains with the probe, replace the probe.

10-8-3 Peripheral Fails

Tighten all grounds. Ensure star washers are under all ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

10-8-4 Still Fails

If all else fails, begin isolation by removing the probes, external peripherals, then the on board ones, one at a time while monitoring the leakage current measurement.

10-8-5 New Unit

If the leakage current measurement tests fail on a new unit and if situation can not be corrected, submit a Safety Failure Report to document the system problem. Remove unit from operation.

10-8-6 In case of using an UPS (Uninterruptable Power Supply)

In case of using an UPS (uninterruptable power supply) repeat the tests without using the UPS, i.e. directly plug the ultrasound system to the AC wall outlet.

Section 10-9
Ultrasound Equipment Quality Check (EQC)

Please download and use the latest version of this forms. They can be retrieved from MyWorkshop.

- EQC - Refer to DOC0929340 in MyWorkshop
- IQC - Refer to DOC0535485 in MyWorkshop

Section 10-10
Electrical Safety Test Form

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct ground & wiring config.)				
System Ground Continuity				
Chassis Source Leakage Current - Potential equilibrium connector				
Chassis Source Leakage Current - Monitor housing				
Chassis Source Leakage Current - Probe connector				
Patient Lead Source Leakage (Lead to Ground)				
Patient Lead Source Leakage (Lead to Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Leakage Current				
Peripheral 1 Ground Continuity				
Peripheral 2 Leakage Current				
Peripheral 2 Ground Continuity				
Peripheral 3 Leakage Current				
Peripheral 3 Ground Continuity				

PROBES

Probe Number (from previous page)	Max Value Allowed	Max Value Measured	OK?	Comments
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

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